# 1954

# NATIONAL OAT NEWSLETTER

Vol. V



March 1, 1955

Sponsored by the National Oat Conference

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Vol. 5

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Sponsored by the National Oat Conference

## Newsletter Policy*

The National Oat Newsletter was originally conceived as a medium of communication between research workers on oats with distribution restricted to Federal and State workers and their counterparts in Canada. Emphasis has been on the fundamental phases of oat research and the successive stages which lead to the development and introduction of new oat varieties. Generous cooperation and the free exchange of ideas and plant materials has been one of the most important objectives and achievements of the Newsletter to date. Continued existence of this favorable situation is believed possible only so long as contributors have confidence that their frank discussions are used in the spirit intended. Particularly is this true in the consideration of possible new variety releases. Usually it is the case that such discussion is of a very tentative nature -- possibly two to three years ahead of a firm decision -- and advance public publicity could create special problems for an Experiment Station.

The Executive Committee of the National Oat Conference has become concerned with the increasing number of requests for "information copies" from sources whose activities are beyond the scope intended for the Newsletter. The Committee wishes to reiterate that the Newsletter is not a publication in the ordinary sense of the word, and urges that its distribution be governed by the above statement of policy. The Committee recognizes that some commercial companies have research activities which legitimately would entitle them to the Newsletter and will give consideration to such cases.

*By action of the Executive Committee, February, 1955.

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*Received after typing in progress.

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# I. CONFERENCE AND REGIONAL NOTES

Present Officers and Representatives of the National Oat Conference:*

Chairman:
Kenneth J. Frey (Iowa)

Secretary:
Frank A. Coffman (USDA-Beltsville)

Representing the Northeastern Region:
C. S. Bryner (Pennsylvania), N.F. Jensen (New York)

Representing the North Central Region:
K. J. Frey (Iowa), J. M. Poehlman (Missouri), E. G. Heyne (Kansas)

Representing the Southern Region:
W. H. Chapman (Florida), A. M. Schlehuber (Oklahoma)

Representing the Western Region:
D. W. Robertson (Colorado), second representative to be named.

Representing the Oat Project, USDA:
H. C. Murphy (Ames)

Representing the Section of Cereal Crops and Diseases, USDA:
H. A. Rodenhiser (Beltsville)

*This group functions as the executive committee.

Secretary's Report National Oat Conference Executive Committee
January 31, 1954 to February 1, 1955

The Executive Committee met once during the year. At the Hotel Lowry, St. Paul, Minn., at 4:15 p.m., Thursday, November 11, the meeting was called to order by Chairman Neal F. Jensen. Committee members present included:

| | |
|---|---|
| Northeastern Region | Neal F. Jensen |
| North Central Region | K. J. Frey, J. M. Poehlman, and E. G. Heyne |
| Southern Region | W. H. Chapman and A. M. Schlehuber |
| Oat Project Member | H. C. Murphy |
| Secretary | F. A. Coffman |

Members not present were C. S. Bryner of the Northeastern Region, D. W. Robertson of the Western Region, and H. A. Rodenhiser, Cereal Section Representative.

Committee membership changes not previously announced in the Oat Newsletter include: C. S. Bryner to succeed Lincoln Taylor in the Northeastern Region; and A. M. Schlehuber and W. H. Chapman to succeed Darrell Morey and I. M. Atkins in the Southern Region.

Matters considered by the Executive Committee were those included in the memorandum dated September 20, 1954, which was directed to the Committee by the Chairman, N. F. Jensen. That memorandum related almost exclusively to the question as to whether or not the National Oat Conference should continue to hold its meetings with those of the American Society of Agronomy; and, if not, what measures should be taken toward organizing the National Oat Conference along lines similar to the conferences now being held by other Crop groups.

After full discussion in which all present participated, it was moved by A. M. Schlehuber and seconded by E. G. Heyne, that the National Oat Conference meet separately from the American Society of Agronomy, not more often than once in three years, and the Chairman appoint a committee to explore the possibilities for, and work out the details of, organizing the National Oat Conference on this basis. On vote the motion passed unanimously.

K. J. Frey was designated by the Chairman to bring up the matter at the National Oat Conference which was to follow the Executive Committee meeting.

After some discussion, all of which was favorable to the idea, members present voted approval for the appearance in the next National Oat Newsletter (Vol. 5, 1955) of a notice to the effect that any new discovery of special interest to oat breeders of North America should be communicated to Dr. H. C. Murphy, In Charge of Oat Investigations of the U. S. Dept. of Agriculture, thus enabling him to make such information available to all those associated with oat improvement work.

Other matters discussed included that of committee, organization and membership, and the desirability of a full representation from all regions. The matter of the Oat Conference Newsletter, its form and contents, was also considered.

The Chairman made two announcements: (1) That as a result of the mail ballot K. J. Frey had been elected the new Chairman of the National Oat Conference and (2) that Dallas Western had indicated that the Quaker Oat Company of Chicago would again bear the expense of preparing and publishing the National Oat Newsletter.

The Committee meeting was adjourned by the Chairman at 6:25 p.m.

Regional meetings of interest to the National Oat Conference held during the 12-month period were the S-13 meeting of the Southern Region held at Statesville, N. C., March 31 to April 2, 1954, and an organizational meeting of the Northeastern Small Grains Technical Committee at the Hotel New Yorker, New York City, N. Y., June 4, 1954.

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Minutes of National Oat Conference
Hotel Lowry, St. Paul, Minn.
November 11 and 12, 1954

On November 11 the meeting was called to order at 7:30 p.m. by Neal F. Jensen, Chairman. Close to 100 were present. These included one or more representatives from each of some 24 states, a number from different points in Canada, one each from Sweden and Brazil, and several from commercial firms, the Brookhaven National Laboratories, and the U. S. Department of Agriculture.

The report of Secretary was called for, read in summary and approved.

The Chairman then called on M. D. Simons for his report on crown rust investigations in oats in 1954.

Simons handed out reprints from the Plant Disease Reporter, Vol. 38, No. 9, 1954. He stated that all identifications are now being made on the new set of differentials. He mentioned race 263 that was identified in Canada, and announced that 4 new races, 276-279, had been found in South America. He stated that probably race 276, which attacks Santa Fe and Landhafer, occurs in the United States. Race 276 attacks Ukraine. He asked that rust specimens be sent to him, and described the best method for preparing these specimens for mailing.

The Chairman then called on Wm. Roberts who reported on stem rust race isolates received in 1954. He stated efforts were being made to detect different biotypes by different methods and described the methods used.

Roberts reported races found in 1954 specimens gave isolates as follows:

| Race | % | |
|---|---|---|
| 2 | 13.0 | |
| 5 | .6 | |
| 6 | 0.4 | Penna., N. H. and Me. |
| 7 | 59.0 | |
| 7A | 10.0 | (18 states) |
| 8 | 16.0 | |
| 10 | 0.3 | |
| 12 | 0.1 | |

As to 7A he stated it was found in specimens from states as follows:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ill. | 8 | Mich. | 5 | Nebr. | 2 | Ohio | 6 | Va. | 1 |
| Ind. | 1 | Minn. | 7 | N.Y. | 2 | Penn. | 5 | Wis. | 7 |
| Iowa | 4 | Mo. | 2 | N.C. | 1 | S. Dak. | 4 | | |
| Kans. | 1 | Mont. | 4 | N. Dak. | 6 | Tex. | 1 | | |

He stated that Rodney was used as the tester for race 7A.

In the discussion which followed Welsh of Canada stated that 2.6% of all isolates in Canada in 1954 were of stem rust race 6, and that 7A comprised 1.6% of the isolates.

In Canada he said New Garry is the only strain of Garry now considered, and that the older Garry is no longer recommended.

The Chairman then called upon Dr. H. C. Murphy to discuss the results of the several nursery programs under his leadership. Murphy stated that the oat crop of 1954 was the second largest on record. Oats were grown on about 42 million acres, and of the total crop some 82% is grown in the North Central Region. He discussed regional average yields and the severity of infection by crown and stem rust in 1954. He mentioned the ranking of oats as to crown and stem rust resistance and presented data obtained by W. Q. Loegering on the crown and stem rust nurseries. He referred to data from Browning and Roberts on crown rust races 202 and 263 and on stem rust races 6, 7, 7A, and 8.

Some discussion then followed as to the method used for calculating the coefficient of rust infection and this method was explained by Murphy.

Dr. Murphy then discussed the results for the 1954 season from the Uniform North Central States Oat Nursery. He supplied those present with copies of the data he had compiled on the 1954 crop and mentioned the high points of the seasons results.

Dr. Murphy also reported the availability of compilations of data on the World Collection of Oats. He stated that copies of same could be obtained by writing to D. J. Ward at Plant Industry Station, Beltsville, Maryland.

F. A. Coffman was called upon by the Chairman to present results obtained in 1954 on the uniform yield nurseries under his supervision. Preliminary

compilations were distributed to those present giving the results on uniform nurseries as follows: Northeastern States, Spring Sown Red Oat, Special Winter Oat, Fall Sown Oat, and Florida-Gulf Coast. Some of the high points of the season's results from each were mentioned, and he also made a few comments on the results obtained from the 1953-54 Winter Hardiness Nursery.

Some discussion followed the distribution of these data. Matt Moore of St. Paul asked what virus was present in Southern oats. This question was answered by U. R. Gore and H. C. Murphy who stated that it appeared to be Marmor terrestre. Moore also asked about the two strains of Mo. 0-205 mentioned in the summary data on Spring-Sown Red Oats. Dr. Poehlman explained that in Missouri only Mo. 0-205 (C.I. 4988) was being increased and that the sister strain, C.I. 5323, was being dropped by the Missouri station.

Harland Stevens was called upon and reported briefly on the results from the Uniform Northwestern States Nursery grown on irrigated and non-irrigated stations. He stated that as reports from only 6 stations had been received by him up to that time, summary data were not as yet available. He reported that H. victoriae was observed on some oats at Aberdeen, Ida., in 1954. He asked that seed of prospective new entries for uniform nurseries in the Northwest Region be sent to him at Aberdeen where they could be increased for later use in the extensive uniform regional nurseries being grown in the Northwest. Seed needs for new entries in the Northwest Regional nurseries, he explained, are very heavy.

H. C. Murphy was then called upon to report on the use of new funds for oats obtained in recent years. He reported $40,000 was received in 1953-54 and $50,000 additional became available for oat investigation in the fiscal year 1954-55. He thanked the oat men present for their interest in the Oat Project's welfare and asked that new members of the Cereal Section working on oats who were present to stand and he introduced each and outlined briefly his particular field of investigation. New members of the Oat Project staff present were:

| | | |
|---|---|---|
| M. D. Simons | Ames, Iowa | |
| Frank Peter | Aberdeen, Idaho | (½ time oats) |
| Leon Wood | Brookings, S. Dak. | |
| Wm. Roberts | St. Paul, Minn. | |
| R. S. Caldecott | St. Paul, Minn. | (½ time oats) |
| Robt. Takeshita | Urbana, Ill. | |
| A. L. Hooker | Madison, Wis. | |

Murphy stated that Dr. H. H. Luke of Stoneville, Miss., Clemmer Marcus of Beltsville, Md., and L. J. Michel of Ames, Iowa, were other new members of the project not present.

He mentioned that additional support had been given the work at Tifton, Ga., and Gainesville, Fla., and that one additional position, that of a Plant Physiologist to work on fundamental problems in winter hardiness of oats was to be filled and that the man chosen would probably be located in the Northeast.

The Chairman then called upon the members present to name and describe any new oats being released in their states.

A. M. Schlehuber described Cimarron (C.I. 5106) and stated that 3,500 bushels of seed were distributed in the fall of 1954. H. C. Murphy inquired about the leaf spot disease of that oat. Schlehuber referred the question to Dr. Young of Oklahoma who stated that the trouble exists and that it was described by H. R. Rosen as Cladasporium.

Mr. Harland Stevens announced that Winema (C.I. 4373), a new oat variety in western Oregon, is an early, stiff-strawed oat that yields well. Winema was selected from a Magistral-Richland cross made by T. R. Stanton at Arlington, Va.

Dr. R. W. Caldwell announced that a backcross of Benton$^{7}$ x Landhafer probably would be released for growing on a small acreage in Indiana in 1955. Only some 400 bushels of seed are available. Caldwell also announced that Nemaha x (Clinton x Boone-Cartier) (C.I. 6642) was up for consideration and the decision as to whether it would be increased or not likely would be taken this winter. Dr. Chas. Brown of Illinois announced this latter oat lead a considerable number of entries in severity of septoria infection in tests in Illinois in 1954.

Dr. H. L. Shands announced that Beacon x (Hajira-Victory) (C.I. 6752) was up for consideration in Wisconsin. He stated that it was mediocre in most tests but has short, plump kernels, and is moderately resistant to crown rust. He stated that another oat which had been given considerable attention in Wisconsin is susceptible to septoria and there was not much chance that it would be increased.

Dr. Welsh of Canada announced that he had "a naked oat bearing the same disease resistance of Garry." He stated its yields were high when calculated on a hull-free basis.

The Chairman then stated that since this completed the general "round-up" of the results from oat experiments in 1954, the conference would next take up matters of special importance to the conference organization.

He announced that as the result of a mail ballot held by the National Oat Conference Committee, K. J. Frey of Ames, Iowa, had been elected to be the next Chairman of the National Oat Conference.

He reported that the National Oat Conference Committee had voted to sponsor the release from time to time by Dr. H. C. Murphy, In Charge of Oat Investigations of the U. S. Dept. of Agriculture, such new information as seemed to Dr. Murphy to warrant release in a "flier" or memorandum to all members of the Oat Conference. These "fliers" would supply the members with information on any new discovery or new development in oats that had been reported to Murphy since the appearance of the most recently published National Oat Newsletter. Those working with oats were asked to supply information as to any new observations to Murphy who in turn would keep National Oat Conference members up-to-date at all times on new matters of vital interest with regard to the crop.

The chairman then called upon Dr. Elmer Heyne to read the resolution voted unanimously by the Committee in their meeting held just prior to the Conference. The resolution read was:

We resolve that the National Oat Conference express its appreciation by giving a vote of thanks to Mr. Dallas Western of the Quaker Oats Company for his interest and efforts in obtaining generous support for the publication of the National Oat Newsletter and for his efforts in obtaining financial support for oat research in the United States.

Adoption of the resolution was moved by Heyne and being duly seconded was passed by a unanimous standing vote with an enthusiastic demonstration.

Dr. Heyne then asked permission of the chairman to read a second resolution. Permission being granted the resolution was read as follows:

Whereas, Dr. Neal Jensen of Cornell University has served as the editor of the National Oat Newsletter for the past 4 years this Oat Conference wishes to express their appreciation to him for the assembling and the splendid preparation he has made of these annual letters.

Heyne then moved its adoption and this too was duly seconded and was also passed by a unanimous standing vote accompanied by a very enthusiastic demonstration of appreciation.

Both Western and Jensen thanked the Conference for their expression of appreciation.

The Chairman announced that as some discussion had been heard relative to the National Oat Conference holding its meetings separately from those of the American Society of Agronomy and in order to bring the matter before the conference for its consideration he would ask Dr. K. J. Frey to present the arguments for and against the idea.

(In response Frey pointed out) that the activities and interests of the Conference have multiplied to the point where it has become increasingly difficult for the membership to conduct its annual business and program in the limited time practical when held with the national agronomy meetings. In addition to the evening meeting and papers as now held, additional time must be taken for a meeting of the executive committee. The program of papers tends to be crowded and more time for informal presentation and discussion would be desirable. The open nature of the present meetings restricts the free exchange of information, particularly in the discussion of such matters as possible new variety releases where station representatives are understandably reluctant to prematurely publicize or discuss new material. It is the belief of many that the activities connected with the national Agronomy Society's meetings are so varied and distracting that it is not feasible to conduct an intensive work conference in conjunction with it. Frey pointed out that separate conferences were being held for wheat, corn, alfalfa and other crops with excellent results. Attendance at these is perhaps stimulated by the fact that travel expense for attending was in many cases borne by the Experiment Stations whereas most attend the Agronomy Society meetings at their own expense.

Frey then observed that separate meetings would likely mean the holding of an additional meeting every 3 or 4 years which would entail extra expense.

Frey then asked that the Secretary read the motion as prepared by the Executive Committee in their meeting held prior to the Conference itself. This was read as follows:

That the National Oat Conference meet separately from the American Society of Agronomy not more often than once in three years and the Chairman appoint a committee to explore the possibilities for and work out the details of organizing the National Oat Conference on this basis.

Frey moved the acceptance of this motion, which was duly seconded and the Chairman called for discussion. K. J. Frey then mentioned the cooperation given by the officials of the Society in arranging the oat program and the oat conference.

H. C. Murphy pointed out the fact that other groups including corn, sorghum, barley, and wheat hold their meetings separately.

Finkner asked if the Society did not favor our meeting with it and asked if we should have papers, etc., if we met separately. Frey described the meeting of the North Central Oat Technical Committee held at Purdue University Agricultural Experiment Station, Lafayette, Ind., in January, 1954, and stated that the meeting was informal and a free exchange of information and ideas took place. A. M. Schlehuber pointed out the difficulties caused by transportation to an Agronomy meeting when several differing in interests attended. H. L. Shands mentioned the difficulties he had experienced in arranging an oat symposium. Zelinsky stated that from the viewpoint of those from Canada it would be easier to attend an oat conference than a scientific Society meeting. He also pointed out the wide interest of the material presented at a national conference. M. B. Moore mentioned the desirability of national meetings since problems discussed are of national interest.

O. T. Bonnett observed that the motion before the Conference covered two points, namely, 1) the question of meeting separately and 2) the organization of the Conference on this basis if agreed to meet separately. He suggested that these might be considered separately. The pending motion, with the approval of mover and seconder, was then withdrawn by unanimous vote after appropriate discussion. O. T. Bonnett then moved "That the National Oat Conference does not break with the American Society of Agronomy but continue to meet with them as now." The motion was duly seconded.

Browning of Iowa then moved as an amendment to Bonnett's motion that "If the National Oat Conference does not meet separately from the American Society of Agronomy that the Conference meet every other time with the American Phytopathologic Society."

Browning's amendment to the motion was duly seconded. After some discussion a vote on Browning's amendment resulted in a vote of 16 for to 23 against --amendment lost.

A vote then was taken on Bonnett's motion which resulted in a vote of 15 for to 17 against--motion lost.

Finkner moved and it was duly seconded "That a Committee be appointed to look into the matter of the formation of a National Oat Conference and submit their findings to the membership (as listed in the most recent Newsletter)." Discussion brought out the point, substantiated by a standing vote of interpretation called for by the Chairman, that the defeat of Bonnett's motion indicated the will of the Conference to meet separately in the future. By vote of the Conference the chair's interpretation was sustained and Finkner then moved, duly seconded, that his (Finkner's) motion be withdrawn--motion carried. Finkner then moved, seconded by Frey, "That the Chairman-elect appoint a committee to work out the details of organization to permit the National Oat Conference to meet separately from the American Society of Agronomy, such findings to be submitted to the membership for approval--motion carried unanimously.

The Chairman announced that the membership of the Committee provided for in the motion just passed would be a duty of the incoming Chairman.

He then announced that the National Oat Newsletter would be published and that the Quaker Oats Company would again defray the expense of the publication which resulted in appreciation demonstration.

Thurman asked if it would be possible to obtain wider distribution of the Newsletter than in previous years. Frey and Moore each discussed the advantages of having a limited publication.

Finkner asked if a committee should not be appointed to decide matters related to the nomenclature of genetic factors of oats. D. W. Robertson explained the methods used in barley. Finkner indicated his belief that the National Oat Conference should sponsor a committee who would designate the genes in oats. Discussion resulted, McKey of Sweden, Robertson of Colorado and Heyne of Kansas spoke on the subject. The latter pointed out the difficulties involved and McKey indicated original designations might well be retained on the basis of priority.

It being 11:05 p.m. and the meeting having been in continuous session for more than three and one half hours the chairman declared a recess for 10 minutes.

Recess November 11, 11:05-11:15 p.m.

The Conference was again called to order by the Chairman who asked A. M. Schlehuber to state the problems arising from attempts to obtain certification of oats for seed purposes. Schlehuber described the situation in Oklahoma and pointed out the difficulties in having oats certified in his state. Schlehuber then asked that the chair call on W. H. Chapman to explain the situation in Florida. Chapman responded by outlining the difficulties experienced in having seed oats certified in Florida. Chapman in turn asked that F. A. Coffman be called on to explain what is probably one of the most important reasons for so-called "off-types" in our new varieties. Coffman explained this as probably being due to a large extent to the fact that most recently released varieties are largely of Avena byzantina origin and that many A. byzantina derivations were prone to produce aberrant types. Hence, by the use of such varieties as parents in hybridization the characteristic tends to be transmitted to the progeny thus resulting in more or less genetic instability in new oats and the appearance of aberrant types.

Thurman of Arkansas explained the situation he had observed in his state. H. C. Murphy explained that fluorescence in oats "might well be considered as a helpful tool in varietal identification but not a final method for the identification of varieties." The Chairman suggested the matter might well be approached by the Crop Improvement organization. Welsh when called upon by the chair described the situation in Canada and stated the breeder and the analyst worked together in varietal identification. McKey was asked by the chairman to explain the situation in Sweden. McKey stated that the seed analyst in that country comes to the plant breeder, obtains a seed sample of the variety and then the analyst makes the description on the basis of the sample received by him from the breeder. Davidson of the U. S. Department, who is charged with administration of the Federal seed law spoke on the problem from the seed analysts viewpoint. He stated that there was no desire on the part of the Federal seed analysts to take over and define what constituted a variety, but that they deal with mixture of varieties.

During the meeting the Chairman called on those present from Canada, Sweden, and Brazil to stand and he introduced these men to the Conference.

No action was taken by the Conference following the discussion of the matter of seed certification of oats and the chairman announced the adjournment of the conference, after it had been in session for some five hours, at 12:25 a.m., Friday, November 12.

Franklin A. Coffman, Secretary

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## Organization of Northeastern Small Grains Technical Committee

by L. H. Taylor, Secretary

A Small Grains Technical Committee for the Northeastern Region was organized at a meeting of the small grain workers of the Region on June 4, 1954 in New York City. N. F. Jensen of New York was elected chairman of the Committee and L. H. Taylor of Maine, secretary. Other state representatives were R. G. Rothgeb, Maryland; C. S. Bryner, Pennsylvania; Collins Veatch, West Virginia; and R. S. Snell, New Jersey. (Steve Lund has now replaced R. S. Snell as representative from New Jersey.) From the U.S.D.A., F. A. Coffman will represent the Section of Cereal Crops and Diseases; W. A. Baker, the Section of Cereal and Forage Insect Investigations, and Nolan Ferris, the Office of Experiment Stations on the Committee.

Following the discussion of small grain problems at the meeting a decision was made to prepare a regional research project on small grains with sub-projects on breeding and cultural practices. Committees have been working on write-ups of these sub-projects. If the project is approved it will be activated as N.E. -23 on July 1, 1955. Although this project will concern itself with all of the small grains in the Northeastern Region it is likely that a considerable part of its work will deal with winter and spring oats since these crops make up more than one half of the acreage planted to small grains in the Region.

## Report of the Southern Technical Committee

by H. R. Rosen, Secretary

The Southern Technical Committee of Regional Project S-13 met at Statesville, North Carolina, on March 31 to April 3, 1954. Thirty-five members were present. A mimeographed report of the proceedings has been prepared and distributed mainly to the members of the Southern Region. A few additional copies are available.

Included are the following items: a new source of germ plasm for combined resistance to crown rust and Helminthosporium blight of oats found in Arkansas; agronomic and pathological data on oats and wheat in Georgia; greenbug infestation and the recording of the least damage on Camellia, C. I. 6722, C. I. 6740, and C. I. 6914 at Thomasville, Georgia; discovery of Helminthosporium-blight-resistant oats in Victoria derivatives which showed some resistance to crown rust races 45 and 57 in Mississippi; spikelet-drop and abnormal roots of oats in Mississippi; a selection of Abruzzi rye resistant to leaf rust and seven synthetic rye varieties selected for resistance to leaf rust and other desirable qualities in Mississippi; studies on soil-borne wheat mosaic with reference to physical and chemical properties of the virus in the soil in North Carolina; screening of the World Collection of barley for resistance to powdery mildew, leaf rust, soil-borne virus and winter hardiness has been completed, 95 entries of oats from the World Collection have been studied for reaction to soil-borne virus, smut, crown rust and winter survival, and 41 entries of Taylor's wheat hybrids have been tested for resistance to leaf and stem rust, powdery mildew and soil-borne virus in North Carolina (USDA); percentage of protein and total protein per acre of Atlas 50 and Atlas 66 wheat varieties in diverse localities of Texas and Oklahoma; winter hardiness as related to length of dormancy and studies on stiffness of oat straw in Tennessee; release of three new wheat varieties including Bowie and Travis which are resistant to stem rust race 15 B in Texas; description of tests performed in the Soft Wheat Quality Laboratory at Wooster, Ohio, USDA; the problem of off-type oats in Avena byzantina derivatives, USDA; hardiness in oats as related to different regions, USDA; report of testing of J. W. Taylor's wheat hybrids for resistance to leaf and stem rusts and the finding of 19 selections with resistance to both, including stem rust race 15 B, USDA; reaction of several foreign and domestic wheats to powdery mildew, USDA; and a report on small grain insects which included tests on oats for greenbug resistance--none found with a high degree of resistance although Camellia, Cherokee and Andrew were among the better ones tested.

## II. CONTRIBUTIONS - SPECIAL ARTICLES

### William Price Wood, Jr., A Commercial Oat Breeder Passes On

By T. R. Stanton

William Price Wood, Jr., died suddenly of a heart attack on November 8, 1953, while visiting his son at Fork Union (Virginia) Military Academy. He was the son of Mrs. Sudie Rucker Wood and the late William P. Wood, Sr., and was born in Richmond, Va., April 3, 1905.

Mr. Wood was a graduate of Virginia Polytechnic Institute, and held a M. S. degree from Cornell University, where he majored in Plant Breeding.

At the time of his death he was President and a partner in the well-known seed firm of T. W. Wood and Sons, Richmond, Va., of which he became a member shortly after graduation. Mr. Wood served as President of the Southern Seedsmen's Association in 1937 and also as a member of the Executive Committee during the following years. He was one of the youngest men ever to be named President of that Association. He likewise served in the positions of Vice-President, President, Director and Secretary of the Virginia Seedsmen's Association over a period of years.

Mr. Wood served as a Major in the U. S. Army during World War II, was a member of the Commonwealth and Country Clubs of Virginia, St. Stephen's Episcopal Church of Richmond and the Virginia and Richmond Chambers of Commerce.

Mr. Wood's company was one of the first commercial seedsmen to merchandise Winter Turf (Virginia Gray) oats, probably from its founding in 1879. This company later introduced Lee (Lee Coldproof) oats to the farmers of Virginia, which through the special efforts of William P. Wood, Jr., was increased and distributed from an original stock of one bushel of seed furnished by the U. S. Department of Agriculture from its then Arlington Farm, Rosslyn, Va. More recent introductions of improved oats by the Wood Co., have been the productive new varieties, Fulwood, Woodgrain and Woodlee, developed under the direction of Mr. Wood, Jr., during the last few years of his life. He also was instrumental in the development of many stocks of hybrid corn. Furthermore, his company selected and first placed on the market seed of the well-known soft red winter wheat variety, Leap (Leaf's Prolific).

Bill Wood, as he was affectionately known to his many friends, was a human dynamo for work and a very enthusiastic plant breeder. His imagination knew no limitations regarding the great potentialities of what might be accomplished through plant breeding, especially for the improvement of the cereal grains, soybeans, legumes and grasses. He will long be remembered by his friends who knew him best for his many contributions to the agriculture of Virginia and adjoining states through the dissemination of better strains and varieties of field crop plants.

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Relative Acreage and Farm Values of Oats as Compared with other Field Crops Grown in U.S. (Based on most recently available figures)[1]

| | Farm Value[2] 1952 | Acreage[2] 1954 |
|---|---|---|
| Cereals: | | |
| Corn | $ 4,996,079,000 | 79,875,000 |
| All Wheat | 2,699,275,000 | 53,712,000 |
| OATS | 1,007,409,000 | 42,151,000 |
| Barley | 307,953,000 | 12,994,000 |
| Rice | 294,156,000 | 2,405,000 |
| Sorghum and broomcorn[3] | 265,178,000 | 18,017,000 |
| Flax (seed) | 115,801,000 | 5,663,000 |
| Rye | 27,359,000 | 1,718,000 |
| Buckwheat | 4,491,000 | 149,000 |
| All Cereals | 9,717,701,000 | 216,684,000 |
| Other Leading Field Crops: | | |
| Cotton | 2,617,346,000 | 19,187,000 |
| Tobacco | 1,128,320,000 | 1,645,400 |
| All Hay | 2,586,916,000 | 72,770,000 |
| Soybeans | 796,251,000 | 17,037,000 |
| Seed: Alfalfa, Clover, Timothy, Lespedeza | 120,038,000 | 3,012,000 |
| Beans, peas, cowpeas, velvet beans | 161,100,000 | 2,535,000 |
| Sugarcane: sugar, seed and syrup | 59,066,000 | 342,000 |
| Sorgo for syrup | 5,766,000 | 48,000 |
| Sugar beets: Sugar and seed | 121,837,000 | 878,000 |
| | 7,596,640,000 | 117,454,400 |
| Total 59 Crops[4] | | 336,954,000 |

[1]Figures taken from Agricultural Statistics 1953 and Crop Production Annual Survey for 1954. Both publications of U. S. Department of Agriculture.

[2]Preliminary figures in some cases; and also in some cases acreages partially duplicated.

[3]Includes sorghum for grain, forage, silage, and broomcorn. Value of sorghum for silage figures as equal to average acre value of the crop for seed and forage.

[4]Includes fruits and vegetables as well as field crops.

# Winter Oats -- Going Up

By Franklin A. Coffman

The increased interest in fall sown oats is an important new development in American agriculture. The extent of this expansion is realized only when we compare the oat acreage of 1954 with that of ten years ago in states where fall-sown oats are important.

In the 13 states in which oats are grown largely or exclusively from fall seeding the total oat acreage increased from an average of 5,147,000 acres in the 10-year period 1935-44 to 9,084,000 acres in 1954. (Table 1). This is an increase of 76.5 percent nearly all of which is fall sown oats. Even more striking are figures from certain states. All of the 13 states except Oklahoma had increased acreages of oats in 1954. Excessive drought in Oklahoma in the fall of 1953 precluded the sowing of a normal acreage. The greatest percentage increase, 1325 percent, occurred in Florida but Florida started with only 12,000 acres. Increases among other states in the Deep South were 217 percent in Alabama, 206 in Mississippi, 176 in North Carolina, 110 in Georgia and nearly 100 percent in South Carolina. Farther north the increases were nearly as large. The acreage expanded 266 percent in Delaware and 265 percent in Kentucky. Arkansas expanded 123 percent and Maryland more than 100 percent. In Texas the expansion was only 63 percent, but if such increases continue Texas may soon become one of the leading oat states of the country. Farther north fall sown oats are provoking increased interest in New Jersey and Pennsylvania, and even in the southern border of the Corn Belt.

The reasons for this shift in oat production were the release of varieties that were (1) crown rust resistant and (2) more hardy. Previous to the introduction of Victoria no satisfactory source of crown rust resistance in oats was available. Rarely can the exact date of an occurrence of major importance in agriculture be stated but such an event is recorded in John Parker's 1929 oat fieldbook at Manhattan, Kansas. His note shows the day on which the crown rust resistance of Victoria was observed. Five men; J. H. Parker, H. C. Murphy, C. O. Johnston, Alvin Lowe and F. A. Coffman were inspecting Parker's rust nursery row by row when the observation was made. The oat rust nursery that year was grown near where the college dairy barn now stands. The crown rust resistance of Victoria, a South American introduction was unknown before that date. A few hours later this writer sent a letter to Loren Davis at Aberdeen, Ida., which resulted in the first planned cross with Victoria made in North America. Davis crossed Victoria with Appler, but Victoria was not homozygous for resistance to crown rust, and as he had chanced to choose a susceptible Victoria plant, his cross proved worthless for the purpose intended. Some 8 months later, in March 1930, at Arlington Farm, T. R. Stanton obtained the fabulously famous single seed of Victoria-Richland and the writer obtained the Victoria-Nortex and Fulghum-Victoria crosses. The latter two became of interest to the South.

What happened thereafter is well known, including the rise and fall of Victoria derivatives, the all too brief period of popularity of Bond for crossing, especially for the South, and the newer series of crosses in which

Landhafer, Santa Fe and Trispernia have been used as parents.

It is recognized that it is difficult to obtain increased hardiness in oats but the important historical successes are reasonably clear. A Georgia farmer, A. J. Fulghum, while walking in his oat field one Sunday morning in the spring of 1892, observed one plant that was earlier and taller than those adjacent. This he selected and later it became the Fulghum variety, genes of which are now carried by most of the fall-sown oat varieties grown in America.

In 1920, T. R. Stanton working at Arlington, Va., reselected Fulghum obtaining Pentagon among others, and N. I. Hancock of Knoxville, Tenn., in 1930 reselected Stanton's reselections and obtained Fulwin, Tennex and Forkedeer.

Other historically important selections were Aurora, from Red Rustproof by C. W. Warburton in 1909, a pure line of Winter Turf by Warburton in 1908, and Hairy Culberson from the old Culberson oat by T. R. Stanton in 1920. All were selected at Arlington, Va.

In 1916 Stanton working at Arlington made the first noteworthy winter oat cross in America. From this Winter Turf x Aurora cross he obtained Lee. In 1925 the late George J. Wilds of Hartsville, S. C., made one of the most important winter oat crosses ever effected. He crossed Big Boy (Norton No. 20-93) with Navarro and from it Coker's Pedigreed Seed Co. developed the original Fulgrain, an entirely new type of oat in this country. In 1926 W. D. Mankin an assistant in the Oat Project working at Arlington, Va., effected a cross between a sister of Pentagon and Hairy Culberson from which C. B. Cross of Oklahoma later derived America's presently most hardy oat, Wintok.

At present Wintok, Forkedeer, Fulwin, Pentagon, Lee, Hairy Culberson, and the recent N. Y. Selection developed by N. F. Jensen and his predecessors at Ithaca are being crossed extensively to produce more winter hardy oats for American farms.

Data obtained from cooperative hardiness nurseries indicate that Wintok survives 18 percent better than Lee which approximates Winter Turf in hardiness. Thirty years ago Turf was considered our most winter hardy variety. It is of even more interest that where winter temperatures average 35°F. or lower Wintok has survived with a worthwhile stand 79.8 percent of the time and Lee only 56.5 percent of the time. Hence Wintok withstands cold winters 40 percent more often than does our hardiest oat of 30 years ago. Since Forkedeer and Fulwin approach Wintok in hardiness it is readily seen why interest in the culture of winter oats is spreading northward into New Jersey and Pennsylvania, lower New England, even into New York, and across the southern part of the Corn Belt Region.

The expansion of winter oats is only partly reflected in the figures presented in Table 1. The use of fall-sown oats for pasture has had a comparable increase. Recently information was received of the seeding of one area of several thousand acres with an aeroplane which, of course, required the equivalent of seed oats by the carload. The extent of winter oat expansion is only now becoming evident and how far it may eventually go remains to be seen. Thus through the obtaining of crown rust resistant and more hardy varieties, winter oats in the United States now are moving into the top ten field crops in value averaging around $150,000,000.

Table 1. Comparable statistics on the oat crop in the Southern States (From U.S.D.A. Crop Production, Annual Summary for 1954 and previously)[1]

| States | Area Cropped to Oats (Acreage, thousands) | | Yield per Acre (Bushels) | | Total Production (Bushels, thousands) | |
|---|---|---|---|---|---|---|
| | Aver. 1935-44 | 1954 | Aver. 1935-44 | 1954 | Aver. 1935-44 | 1954 |
| Delaware | 3 | 11 | 29.0 | 36.0 | 81 | 324 |
| Maryland | 36 | 76 | 29.3 | 39.0 | 1,048 | 2,691 |
| Virginia | 107 | 250 | 23.0 | 39.5 | 2,498 | 7,070 |
| W. Virginia | 76 | 86 | 22.1 | 34.5 | 1,675 | 1,898 |
| N. Carolina | 248 | 685 | 24.1 | 39.0 | 6,006 | 20,397 |
| S. Carolina | 540 | 935 | 21.8 | 31.5 | 11,834 | 23,846 |
| Georgia | 470 | 990 | 19.7 | 31.0 | 9,310 | 21,235 |
| Florida | 12 | 171 | 14.8 | 30.0 | 184 | 1,080 |
| Kentucky | 76 | 278 | 19.2 | 32.5 | 1,470 | 5,688 |
| Tennessee | 104 | 480 | 19.6 | 30.5 | 2,107 | 8,906 |
| Alabama | 149 | 472 | 19.6 | 29.0 | 2,975 | 6,960 |
| Mississippi | 194 | 594 | 30.5 | 40.0 | 6,315 | 17,080 |
| Arkansas | 249 | 556 | 24.2 | 40.0 | 6,097 | 14,040 |
| Louisiana | 85 | 152 | 29.5 | 36.0 | 2,515 | 3,744 |
| Oklahoma[2] | 1,394 | 1,044 | 19.8 | 25.0 | 27,713 | 19,550 |
| Texas[2] | 1,404 | 2,304 | 23.4 | 23.0 | 33,557 | 41,354 |
| Totals | 5,147 | 9,084 | | | 115,385 | 195,863 |

[1]Some of these figures are preliminary and subject to some change.

[2]Excessively dry in this state in the fall of 1953.

## Pedigreed Seed Nomenclature in Canada

by R. H. Smallfield

The Canadian Seed Growers' Association, Inc. uses a slightly different nomenclature in pedigreed seed production than does the International Crop Improvement Association. Below is a table showing the comparison between the two systems.

| I.C.I.A. System | C.S.G.A. System |
|---|---|
| Breeders' Seed | Foundation Seed |
| Foundation Seed | Elite Seed |
| Registered Seed | Registered Seed* |
| Certified Seed | Certified Seed |

*In Canada, registered seed may be used to produce registered seed for unlimited generations.

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The following diagram illustrates the steps followed in pedigreed seed production.

Foundation Seed (Breeders' Seed)

Elite Seed (Foundation Seed)

Elite Seed — 1st Generation Registered Seed

Elite Seed — 1st Generation Registered Seed — 2nd Generation Registered Seed

Unlimited Generations Registered Seed

Certified Seed

Fresh Foundation Stocks supplied at regular intervals to Elite Seed Growers.

# The Question of Tolerance of Off-types in Strains of Oats Derived From *Avena byzantina* - *A. sativa* Crosses.

By T. R. Stanton, Formerly Senior Agronomist
in Charge of Oat Investigations,
U. S. Department of Agriculture

There has appeared in print during the last few years considerable discussion regarding the ever increasing difficulty encountered in the isolation of fairly pure-breeding morphological and disease-resistant strains from so-called wide crosses between red (*Avena byzantina*), and common (*A. sativa*) oats. It is realized that with more and more crosses being made each year between oats belonging to these two species, the genes, therefore, are gradually becoming more widely diffused ("scrambled"). As a consequence, more time is necessary to select and reselect strains that approach a fairly satisfactory degree of homozygosity in plant and grain characters. In certain older varieties and some new strains this has not been possible. The breeder of course can ignore the lack of uniformity, say of certain grain characters, increase and distribute for farm production, new disease-resistant lines after five or six generations of selecting and testing. If the oats are to be grown primarily for grazing or hay no one will ever know the difference. However, for grain production for both feed and seed some problems arise.

For the last half century plant breeders, seed analysts, agronomists and commercial seedsmen have emphasized the importance of pure seed to produce a uniform product. Seed certification systems have been set up to insure in some measure the distribution of seed of pure-breeding varieties, free from objectionable off-types, mixtures of other known varieties, other grains, and weed seeds. The breeder of oats in particular finds himself in the position that owing to the rapid occurrence of new physiologic races of diseases, especially of the rusts, and the consequent demand for resistant varieties, there is no longer time to select varieties, if possible, to a satisfactory degree of purity to meet certification standards.

Again, it is unfortunate, if the attitude is taken that the too frequent occurrence of off-types is not serious. This line of thinking then boils down to the fact that seed certification becomes almost meaningless, or in the vernacular, is rather definitely out the window. Hence, the farmer finds himself growing a mixture of types, and not a definitely homozygous variety, and a condition approaching that of hybrid corn is resulting in which such a thing as a variety can be no longer recognized.

If, as has been suggested, adjustments are made accordingly, that is to allow for a certain percentage of off-types, in new commercial varieties, the question arises, can the breeder justify his efforts if oat improvement is to be solely on the basis of breeding for disease resistance.

There is no question, therefore, that varietal purity in oats is becoming a problem of considerable importance, not only in the breeding of disease-resistant red oats for the South, but also in the breeding of northern oats as more and more genes from red oats are being introduced into breeding stocks.

There also is the school of thought which comforts itself in the belief that whereas a half century or more ago the American farmer succeeded fairly well when he grew the notoriously variable varieties of oats such as Burt and Fulghum, Dawson Golden Chaff wheat, and even the somewhat less variable varieties of oats such as Sixty-Day and Probsteier, and the original Turkey wheat; so why worry?

A sustained scientific approach to the problem should not be overlooked. Fundamental research in the field of cytogenetics, including the recognition of polyploidy and linkage relationships, the creation of nullisomic gametes by X-ray induction, and so on. By applying certain of these methods or techniques it might be possible to develop complete gametes for stabilizing certain variable grain characters in strains with satisfactory disease-resistance.

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## Oat Production and Oat Diseases in 1954

by H. C. Murphy (USDA-Iowa)

The estimated (U.S.D.A. Crop Reporting Board) total oat production in the United States in 1954 of 1,500 million bushels was nearly one-fourth more than in 1953, one-seventh more than the ten year average, and second only to the record crop of 1945. Although most fall-sown oats were seeded under unfavorable, drought conditions in the fall of 1953 with much seeding delayed until rains in late October and November improved field conditions, these delayed seedings came through the mild winter of 1953-54 in good condition and matured mostly in advance of hot and otherwise unfavorable weather and disease conditions. Fall seedings, particularly for supplementary winter and spring pasturage, represented a larger than usual portion of the total oat acreage. Yields were unusually good in the Atlantic and Central states and in the southern and eastern portions of the North Central Region. Oat seedings for all purposes were estimated at 47,300,000 acres, which was 8 percent above 1953 and the largest on record. It was estimated 42,151,000 acres of oats were harvested for grain in 1954, which is 7 percent above 1953 and, with the exception of 1946, the largest acreage in 28 years. The estimated average yield of 35.6 bushels per acre in 1954 was 4.8 bushels larger than 1953 and 2.3 bushels larger than the ten-year average. The 12 North Central states produced only 79 per cent of the national oat crop in 1954, compared with an average of 82 per cent for the past ten years. The relatively lower production in the North Central Region resulted from a lower proportion of the total acreage and heavy rust damage in some states. Iowa, Minnesota, Illinois, Wisconsin and South Dakota were the "Big Five" in U. S. oat production in 1954, producing 52.9 per cent of the total.

Although oat diseases were less important nationwide in 1954 than in 1953, there was a heavy damage from race 7 of stem rust in parts of Nebraska, Iowa, South Dakota, North Dakota, Minnesota and Wisconsin. In contrast with 1953, when there was an early buildup of crown and stem rust in northeastern Texas and southeastern Oklahoma which moved in a northeasterly direction, the early buildup in 1954 was mainly stem rust and appeared to be mainly in south central

Kansas. The movement from this focus in 1954 was north and more westward than usual. At least, the writer observed stem rust across western North Dakota, eastern Montana and even across the mountains at Aberdeen, Idaho. There was some evidence of an increase in prevalence and severity of race 8 late in the season on varieties resistant to 7, but susceptible to 8. The writer traveled through the southern, southeastern, and north central states during the crop season in 1954. Although stem rust infection on Rodney and other varieties susceptible only to race 7A was observed at numerous locations, there was never more than occasional single pustules in evidence.

Although crown rust caused heavy losses in some areas, the infection appeared to be more sporadic and less severe nationwide than in 1953. Much of the crown rust infection in the North Central Region in 1954 appeared to originate from buckthorns in contrast with 1953 when there was a heavy spore movement from northeastern Texas and southeastern Oklahoma, in addition to local spreads.

Septoria avenae was observed in the southeastern states for the first time by the writer, although only in trace amounts. It was moderately severe in some localized areas in the northern states. Red leaf was locally severe on winter oats in many areas in the southeast and was present but not generally severe in most areas elsewhere.

Victoria blight appeared to be increasing somewhat in prevalence and severity in parts of the fall sown oat region after having been non-evident for two or three years. The writer also observed heavy Helminthosporium victoriae infection on a late-sown irrigated increase plot of a Mississippi selection at Aberdeen, Idaho, and moderately heavy infection on Park and other susceptible varieties grown under irrigation near Sydney in eastern Montana.

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## Reaction of Oat Varieties to Crown Rust in the 1954 Uniform Rust Nurseries

by H. C. Murphy (USDA-Iowa)

Crown rust infection was sufficiently heavy at 34 locations in the United States where uniform oat rust nurseries were grown in 1954 to obtain differential varietal reaction.

Landhafer, (Hajira-Joanette x Fulwin) x (Lee-Victoria x Landhafer) (C.I. No. 6666), Bondvic, and (Bond-Rainbow x Hajira-Joanette) x Landhafer (C.I. No. 6913) were outstanding for high resistance to crown rust with average infection coefficients of 0.6, 0.6, 0.8, and 0.8, respectively. Other named varieties, and experimental selections (listed by C. I. numbers), outstanding for resistance to crown rust in 1954 were C.I. Nos. 6913 and 6917, Clintland, C.I. Nos. 6909, 6908 and 6921, Sunland, Ukraine and Seminole with average infection coefficients ranging from 1.1 to 2.9. Markton, Richland, Minrus, Canuck, Goldwin x Boone (C.I. No. 6915) and Bond were highly susceptible with average infection coefficients of 39.6, 31.7, 20.3, 18.3, 14.0, and 13.5, respectively. With the exception of Goldwin x Boone (C.I. No. 6915) all of the new varieties and selections had average infection coefficients below 10, with an overall average of 4.5. The Landhafer derivatives were outstanding for resistance to crown rust in 1954. There was no evidence of the presence of virulent races 263 and 276 in any of the uniform oat rust nurseries in 1954.

## North Central States Uniform Oat Smut Nursery

by H. C. Murphy (USDA-Iowa)

A cooperative uniform oat smut nursery consisting of 34 varieties and selections inoculated with local collections of smut was grown at nine locations in the North Central Region in 1954. Navarro, Andrew x Clinton (C.I. No. 5968), R.L. 1273 x Spooner (C.I. No. 6939), Clinton x Boone-Cartier (C.I. No. 6933) and Markton were outstanding with an average smut infection of 0.1 percent or less at all locations. Twelve of the 34 entries had average infection percentages of less than 1.0, and 21 entries had average smut infections less than 5 percent. The most susceptible entries were Anthony, Santa Fe, Black Diamond, Victory, Gothland, Sac x Hajira-Joanette (C.I. No. 5927), Monarch and Ukraine with average infections of 52.7, 37.0, 35.8, 35.3, 32.4, 18.3, 18.2, and 16.3 percent, respectively. The only entry completely free of smut infection at all locations was Navarro.

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## Agronomic and Pathologic Data on World Collection of Oats Now Available

by H. C. Murphy (USDA-Iowa)

Detailed agronomic and pathologic notes recorded on major portions of the USDA World Oat Collection grown at various locations in the United States and at Palmer, Alaska, in 1949 to 1953, have been processed and tabulated by means of IBM cards and equipment. These data are available to oat breeders and oat pathologists who have need for the information. Investigators desiring copies of the rather voluminous processed data should write to David J. Ward, Cereal Crops Section, Bureau of Plant Industry, Beltsville, Maryland.

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## Observations on Oats Grown in Yield Nurseries in the Cooperative Coordinated Oat Breeding Program in 1953-54

By F. A. Coffman, H. C. Murphy and Harland Stevens

During the crop season of 1953-54 one or more of the writers visited most of the stations cooperating in these experiments. Visits were made to each of the major production areas and in general the following observations were made.

1. Soil moisture was deficient in some areas of the South in the fall of 1953 but the winter of 1953-54, although not exceptionally mild, did not reduce stands of fall sown oats too severely in any of the major production areas. This was true even though oats did not go into the winter in the best of condition.

2. Except in the Southwest, spring conditions were comparatively favorable and oats developed about as well as usual. In the Southwest droughty

conditions prevailed from early spring until oats were ripe; resulting in reduced yields.

3. Excessive rainfall in the New England area delayed seeding the crop and resulted later on in the development of some diseases. Also harvest was late.

4. Stem and crown rust were present in the upper Mississippi Valley region and Corn Belt areas resulting in considerable loss. Had it not been for rust 1954 likely would have seen the greatest oat crop on record.

5. In the Corn Belt excellent yields were harvested at most points even though rust was damaging in some areas of the Corn Belt.

6. The increase in stem rust races 7 and especially 7A are matters for serious concern.

7. In the Northwest Region oats yielded up to average or above on most irrigated stations. However a water shortage was experienced at a few points. Oats on dry land stations in moisture deficient areas suffered from drought.

8. Data from the Uniform Nurseries received and compiled indicate that results for 1953-54 were as follows:

(A) SPRING SOWN NURSERIES GROWN EAST OF THE ROCKIES

| Yield Rank | Variety or C.I. No. 1/ | Yield (Bu.) | Test (Lbs.) | Height (Ins.) | Lodging % | Date Headed |
|---|---|---|---|---|---|---|
| Northeastern States Nursery (9 Stations) 2/ | | | | | | |
| 1 | Garry Sel. | 67.3 | 31.9 | 41.4 | 18.2 | 7/4 |
| 2 | Imp. Garry | 67.3 | 30.8 | 42.7 | 17.3 | 5 |
| 3 | Simcoe | 65.0 | 30.4 | 44.4 | 20.8 | 5 |
| 4 | 6939 | 62.8 | 33.4 | 41.4 | 14.0 | 4 |
| 5 | Ajax | 62.2 | 30.1 | 43.0 | 30.2 | 5 |
| North Central States Nursery (14 Stations) | | | | | | |
| 1 | 6437 | 76.8 | 34.2 | 34 | 7 | 6/21 |
| 2 | 6936 | 75.7 | 32.7 | 35 | 29 | 21 |
| 3 | 6913 | 75.5 | 33.6 | 36 | 15 | 10 |
| 4 | 6935 | 75.2 | 28.4 | 34 | 23 | 23 |
| 5 | Sauk | 74.8 | 29.9 | 35 | 11 | 25 |

| Yield Rank | Variety or C.I. No. | Yield (Bu.) | Test (Lbs.) | Height (Ins.) | Lodging % | Date Headed |
|---|---|---|---|---|---|---|
| **Spring Sown Red Oat Nursery** (5 East and South Stations) | | | | | | |
| 1 | Andrew | 56.8 | 31.5 | 32 | 30 | 5/14 |
| 2 | Mo. 0-205 | 55.1 | 31.7 | 31 | 12 | 9 |
| 3 | 6621 | 54.8 | 29.1 | 32 | 29 | 15 |
| 4 | 6639 | 53.9 | 29.9 | 30 | 27 | 15 |
| 5 | 6632 | 52.3 | 28.5 | 28 | 34 | 15 |
| **Spring Sown Red Oat Nursery** (6 North Central Stations) | | | | | | |
| 1 | 6632 | 84.3 | 30.4 | 32 | 43 | 6/25 |
| 2 | Mo. 0-205 | 82.5 | 32.8 | 37 | 43 | 26 |
| 3 | 6620 | 81.9 | 33.0 | 37 | 39 | 24 |
| 4 | 6621 | 81.4 | 33.2 | 37 | 55 | 25 |
| 5 | 6631 | 81.3 | 31.6 | 32 | 39 | 25 |
| **Spring Sown Red Oat Nursery** (6 Southwestern Stations) | | | | | | |
| 1 | 6620 | 71.5 | 32.6 | 32 | 48 | 5/24 |
| 2 | 6632 | 71.0 | 31.4 | 31 | 49 | 5/26 |
| 3 | 6639 | 68.1 | 31.1 | 32 | 47 | 25 |
| 4 | Mo. 0-205 | 67.9 | 31.9 | 35 | 23 | 26 |
| 5 | 6621 | 66.9 | 31.6 | 32 | 52 | 25 |
| (B) SPRING SOWN NURSERIES GROWN WEST OF THE ROCKIES | | | | | | |
| **Northwestern States Nursery** (8 Irrigated Stations) | | | | | | |
| 1 | Park | 147.7 | 37.1 | 39.3 | 12.5 | 7/2 |
| 2 | Sauk | 137.3 | 37.2 | 39.1 | 21.2 | 6/26 |
| 3 | 5346 | 136.9 | 38.0 | 38.5 | 10.7 | 6/30 |
| 4 | 3865 | 136.7 | 34.9 | 37.0 | 35.2 | 6/27 |
| 5 | 6612 | 134.2 | 37.1 | 35.7 | 23.7 | 6/28 |
| **Northwestern States Nursery** (9 Non-Irrigated Stations) | | | | | | |
| 1 | Park | 74.7 | 35.7 | 35.1 | 30.0 | 7/8 |
| 2 | Exeter | 74.2 | 35.1 | 38.2 | 40.0 | 7/11 |
| 3 | Rodney | 73.9 | 36.4 | 38.1 | 27.5 | 7/9 |
| 4 | Fortune | 73.7 | 34.0 | 39.3 | 40.0 | 7/8 |
| 5 | Overland | 73.7 | 35.6 | 34.7 | 29.0 | 7/7 |

| Yield Rank | Variety or C.I. No. | Yield (Bu.) | Test (Lbs.) | Height (Ins.) | Lodging % | Date Headed | Surv. % | Forage Rating 3/ % |
|---|---|---|---|---|---|---|---|---|
| (C) FALL SOWN OAT NURSERIES | | | | | | | | |
| Special Winter Oat Nursery (15 Stations) | | | | | | | | |
| 1 | 6717 | 63.5 | 35.1 | 36.6 | 42.5 | 5/17 | 68.6 | 92.8 |
| 2 | Early Wintok | 63.0 | 35.1 | 35.1 | 54.7 | 9 | 81.0 | 106.5 |
| 3 | Dubois | 62.9 | 36.0 | 34.1 | 35.0 | 14 | 77.4 | 101.1 |
| 4 | Wintok | 61.6 | 35.7 | 35.5 | 48.8 | 13 | 75.8 | 102.4 |
| 5 | 6571 | 60.9 | 34.9 | 37.6 | 39.1 | 16 | 65.9 | 87.4 |
| Fall Sown Oat Nursery (11 More Northern Stations) | | | | | | | | |
| 1 | Stanton 1 | 81.5 | 31.6 | 38.5 | 45.9 | 4/26 | 94.5 | 103.5 |
| 2 | 6907 | 80.9 | 28.4 | 39.0 | 59.8 | 25 | 91.3 | 100.9 |
| 3 | 6717 | 79.6 | 31.9 | 38.7 | 39.9 | 30 | 95.0 | 90.8 |
| 4 | Alamo | 79.3 | 32.8 | 35.6 | 31.5 | 20 | 72.3 | 110.4 |
| 5 | DeSota | 78.7 | 32.0 | 35.3 | 41.3 | 27 | 92.5 | 104.9 |
| Fall Sown Oat Nursery (10 More Southern Stations) | | | | | | | | |
| 1 | Delair | 60.6 | 32.6 | 30.4 | 4.6 | 3/23 | 88.8 | 115.7 |
| 2 | 5372 | 56.2 | 27.7 | 34.3 | 23.2 | 4/2 | 93.5 | 104.0 |
| 3 | 6908 | 55.6 | 30.6 | 33.6 | 10.6 | 3/27 | 81.0 | 109.6 |
| 4 | Local Check | 55.4 | 28.7 | 39.0 | 8.0 | 4/2 | 89.5 | 109.4 |
| 5 | Seminole | 55.3 | 29.6 | 38.4 | 24.4 | 3/16 | 40.8 | 118.1 |
| Florida Gulf Coast Oat Nursery (10 Stations) | | | | | | | | |
| 1 | Floriland | 58.0 | 29.8 | 40.3 | 38.4 | 3/22 | - | 114.6 |
| 2 | Alamo | 57.7 | 32.3 | 34.7 | 37.8 | 29 | - | 118.6 |
| 3 | Victorgrain | 57.1 | 31.7 | 36.9 | 25.0 | 4/2 | - | 104.3 |
| 4 | Seminole | 57.0 | 30.5 | 37.7 | 60.4 | 3/20 | - | 118.1 |
| 5 | 6757 | 56.7 | 32.3 | 37.3 | 29.8 | 27 | - | 111.5 |

9. For the benefit of those located east of the Rockies who wish to make oat crosses among spring oats, the 1954 data indicate Landhafer x (Mindo x Hajira-Joanette) x Andrew, C.I. No. 6936, and (Bond-Rainbow x Hajira-Joanette) x Landhafer, C.I. No. 6913, developed at the Minnesota station, are high in yield and grain quality and possess the highest combined resistance to crown rust and stem rust (including potentially important races 6 and 7A). Clinton x Ukraine, C.I. No. 6537, developed at the Iowa station, was outstanding for combined high yield, high test weight, stiff straw and adult field resistance to crown and stem rust. It also has been outstanding for combined resistance to crown and stem rust in the South American uniform rust nurseries. C.I. No. 6537 is fully susceptible, however, to race 7A of stem rust which was reported to have been present in 18 states in 1954.

10. As to earliness, Andrew, its derivatives, Cherokee and Mo. 0-205 appear to be among the best to use as parents.

11. In the Northeastern Region Improved Garry has given indications of proving to be excellently adapted. New York Selection, C. I. No. 6940, has excellent plant characters and should not be overlooked for crossing purposes.

12. To the west of the Rockies, Park was by far the most outstanding entry in both the irrigated and non-irrigated nurseries this past season. The Canadian variety, Exeter, appeared quite desirable on the humid stations and the three varieties, Exeter, Rodney and Fortune produced very high yields.

13. Among fall-sown oats Wintok, Early Wintok and Dubois appear to be among the best sources for winter-hardiness. They also appeared productive in 1954. The latter has very good straw. The sister strains to Mustang, C.I. Nos. 6717 and 6571 should not be overlooked. For milder areas the 1954 data indicate Stanton 1 has merit and also C.I. No. 6709. Where the seasons are so mild that winter-killing usually does not destroy the crop, Alamo and Delair appear among the most likely for use as parents, but Victorgrain 48-93 is a very vigorous and productive oat in all such areas. In the extreme south the early varieties such as Floriland, Alamo, Seminole, Victorgrain, and C.I. No. 6908, although somewhat later maturing than Delair appear favorable in the light of 1953-54 results.

14. The season of 1953-54 was not favorable to the recording of forage data as it was so dry at many points in the fall of 1953 that the oats did not emerge until in the winter. As the result the data shown are primarily from spring estimates.

FOOTNOTES

1/ Key to parents of C.I. numbers:
Spring Oats C.I. Nos. 6620, 6621, 6631, 6632 and 6639 are selections from the cross Andrew x Landhafer: 6913, (Bond-Rainbow x Hajira-Joanette) x Landhafer: 6537, Clinton x Ukraine: 6935 Landhafer x (Mindo x Hajira-Joanette) x Clinton: 6939, R.L. 1273 x Spooner.

Fall sown oats C.I. Nos. 6571 and 6717 are sisters of Mustang: 6907, Santa Fe x (Stanton-Fulgrain), 6908, (Arlington-Delair) x Trispernia: 5372 is a sister to Alamo: 6757, (Fla. 167-Landhafer) x Landhafer.

2/ Number of stations shown indicates number reporting yields. Usually fewer reports were received on other characters.

3/ The checks of forage readings were Lee in the Special Winter and Appler in the Fall Sown and Florida Gulf Coast Nurseries. Check equals 100 percent.

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# World Collection of Oats

by David J. Ward

Five compilations of data from the oat collection were distributed to cooperators in November, 1954. They include data from nearly all of the categories of information recorded at the several experiment stations cited on pages 9-11 of the 1953 Newsletter. It is planned that these will be the first of a series of compilations of data recorded on entries in the collection. The following additional notes are already available or are being recorded from the collection:

| | |
|---|---|
| STEM RUST | VICTORIA BLIGHT |
| Race 6 | Helminthosporium sativum |
| Race 7 - 7A | MILDEW (remainder of the collection) |
| CROWN RUST | SURVIVAL (Ithaca, N.Y.) |
| Race 263 | |

It is anticipated that these and other data recorded in the future will be distributed in subsequent compilations.

Some additional sets of data compilations 1-5 are available for distribution. These may be obtained by writing to me at Beltsville.

The oat collection, including the miscellaneous species samples, will be grown at Aberdeen, Idaho, this summer for seed increase purposes. Preparations are being made for recording a comprehensive set of morphologic and agronomic notes from this planting.

While we may have as our primary objective in evaluating the grain collections the recording of the relative merits of the strains for use in plant improvement work, we should not lose sight of the fact that most frequently our observations are empirical without any background information about the derivation of the characters with which we are concerned. It is to be hoped that as we compile information about oat germ plasm from world wide sources, we may use these data to analyze and interpret some of the evolutionary relationships for the characters with which we are concerned.

It is accepted procedure now to test entire collections of the grains to seek out a few individual strains carrying genes for resisting a specific disease producing organism. At best this is a stab-in-the-dark technique. We have little understanding of where, why, or when such genes came into being. With the exception of the possibilities that controlled irradiation may hold for us, in carrying out plant improvement work we must rely exclusively on our limited sample of what has been evolved in nature.

It seems probable that certain fundamental genetic and ecological relationships have governed the genesis and subsequent evolutionary patterns of characters deemed useful to man. An understanding of these relationships would be of value in seeking out and combining superior germ plasms. Ways might be found to expedite the evolution of new germ plasm or certain world areas might be ascertained to afford a greater potential for locating useful germ plasm.

The grain collections constitute some of the best available media for furthering our understanding of the natural occurring plant materials on which we rely so completely. Morphologic, agronomic, pathologic, entomologic, and any other broad classifications of data recorded on the collections may be useful in analyzing character relationships. We hope to add to our catalogue of information on the oat collection through notes to be recorded this summer. Consideration will be given to any suggestions submitted for recording notes that may be deemed useful for furthering breeding objectives or for contributing to understanding of a fundamental nature of our germ plasm stocks.

The strains in the collection will be grouped according to source for the Aberdeen planting. Since domestic breeding lines constitute a sizeable segment of the collection as it is presently maintained, it is planned to group sister lines with a view to the possible elimination of some of them from the active collection. About 5,200 entries are being maintained at the present time. It should be possible to effect a sizeable reduction in the number of entries that warrant further testing.

Several sets of seed from the entire collection will be put up for distribution after the harvest is completed next summer. New introductions are being distributed for observation as soon as they have been grown in detention at Sacaton, Arizona. Every effort will be made to make seed from the collection available to persons engaged in research or plant improvement involving oats.

## III. CONTRIBUTIONS FROM CANADA

Cereal Crops Division,
Central Experimental Farm
Ottawa, Canada

by R. A. Derick and F. J. Zillinsky

Generally the conditions under which the 1954 oat crop was grown in Eastern Canada were extremely poor. The only complaint entirely lacking was that of extreme heat. The lack of sunshine resulted in a higher than normal proportion of "blast". Although precipitation was not abnormal during the growing period, heavy storms caused considerable lodging and at harvest time excessive rains not only delayed harvesting operations but frequently resulted in the crop being left in the field either uncut or in the stock. The quality of the crop was seriously affected with much of it being unfit for seed. Rusts were more damaging and widespread than usual. Losses resulting from black stem caused by Septoria avenae were more serious and were felt over a greater area. Red leaf was also prevalent in many areas particularly where aphids were numerous.

Improvement of the oat crop at Ottawa now includes a phse of work which, it is hoped, may lead to the establishment of valuable parental material particularly with disease resistance. Some of the diploid Avena species such as A. strigosa and A. brevis possess such desirable characters as resistance to crown rust, stem rust, smut, and black stem. Through species hybridization and production of artificial polyploids involving the tetraploid species as well, work is underway to transfer desirable genes to cultivated oats.

In the normal breeding program hybrid strains from three crosses have been advanced to the Eastern Uniform Co-operative test and these show promise in different areas of Eastern Canada. In Eastern and Northern Ontario a strain from a cross involving Ajax, Roxton and RL 1276 was particularly promising and has reached the seed increase stage. A strain from a cross Glasnevin Ardri x Clinton having good lodging resistance yielded well in Quebec and the Maritime provinces. A third strain originating from the cross Ajax x Abegwit has shown good adaptability in New Brunswick. Seed of this strain is also being increased. A backcross strain involving Beaver as the recurrent parent, and a hybrid (CI 3843 x Beacon) in the original cross, appears to be a definite improvement over Beaver in rust and lodging resistance as well as yield.

The varieties Rodney and Garry 27 both of which were developed at the Cereal Breeding Laboratory, Winnipeg, Manitoba, have given excellent results in parts of Ontario and Quebec. Seed of both varieties is in demand for the 1955 crop.

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Laboratory of Cereal Breeding, Winnipeg
by J. N. Welsh

The artificially induced epidemic of stem rust and crown rust was unusually heavy at Winnipeg in 1954. Under these conditions Garry was highly resistant to stem rust but was less resistant to crown rust, carrying approximately 20 per cent infection. Under similar conditions varieties susceptible to crown rust carried as high as 85 per cent infection. Rodney was as equally resistant to crown rust as Garry but was quite susceptible to stem rust, owing to the presence of race 7A.

On account of the heavy infestation of race 7A, with which the nursery was artificially inoculated, an excellent opportunity was afforded to eliminate lines susceptible to this race. By this means a number of Rodney lines resistant to this race were selected as well as a large number from the cross Garry x (Santa Fe-R.L. 1942). These latter lines also have the Santa Fe resistance to crown rust and the Victoria resistance to smut.

As Santa Fe is susceptible to race 263 of crown rust certain of the above lines will be used in crosses with Ukraine to incorporate resistance to this race. In order to introduce new genes for yield and other desirable agronomic characteristics into the breeding program, varieties such as Eho, Juha, and Sisu from Finland, Pendek from Holland, Rex from Denmark, and Blenda and Blixthavre from Sweden are being used. All of these varieties are susceptible to the rusts and smuts.

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Plant Pathology Laboratory, Winnipeg, Canada

by G. J. Green and B. Peturson

A rather severe oat stem rust epidemic occurred in Manitoba and Saskatchewan in 1954. Most of the commonly grown oat varieties of this region, such as Ajax, Exeter, Vanguard and Fortune, are resistant to race 7 but susceptible to races 8, 10 and 11. Much of the inoculum early in the season was race 7 and early fields of these varieties escaped severe damage. Heavy infections caused mainly by race 8 developed in late fields and no doubt reduced yields considerably. Varieties susceptible to race 7 were heavily infected early in the season and were damaged considerably.

Stem rust races isolated in the nation-wide physiologic race survey in order of prevalence were: 7, 8, 10, 2, 5, 11, 7A, 6, 13, 4 and 12. Races 2, 7, 7A, 8, 10 and 11 were distributed across the country; races 6 and 13 were found only in Ontario; races 5 and 12 occurred only in Western Canada and race 4 only in New Brunswick. It is of interest that race 7A occurred in Eastern and Western Canada as it did in 1953. Races 6 and 13, which can attack White Russian and Richland, have occurred in Eastern Canada for several years but have not been found in Western Canada in recent years.

A trace of crown rust on Vanguard oats in the Edmonton, Alta. rust nursery indicated that this rust had spread farther north and west in 1954 than in any year since 1926. Most oat varieties grown in Western Canada are susceptible to crown rust and heavy infections developed in Manitoba and eastern Saskatchewan. In spite of the epidemic most of the oat crop was not seriously affected but late fields were damaged considerably.

In 1954, the following 18 crown rust races were isolated in Canada: 201, 202, 203, 205, 209, 210, 211, 212, 216, 228, 229, 230, 231, 234, 235, 237, 239 and 240. Races 201, 202, 203, 216, 239 and 240 comprised, in the order named, 15.0%, 28.0%, 12.0%, 5.3%, 7.3% and 8.0% of all isolates identified. Each of the other races comprised less than 5% of the isolates. Eighty-two per cent of the isolates originating in Western Canada and 51.2% of those from Eastern Canada were capable of attacking varieties possessing the Bond type of resistance to crown rust. Only one race (216) capable of attacking Victoria was isolated. It was found once only. The new varieties Garry and Rodney proved to be resistant to well over 60% of the isolates identified. No races were found that could cause appreciable infection on the varieties Landhafer, Santa Fe and Trispernia.

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## Ontario Agricultural College

by D. N. Huntley (Guelph)

An extensive regional testing program was undertaken in southern Ontario to compare the four new oat varieties; Garry, Rodney, Simcoe and Shefford with the varieties commonly grown. The superiority of the first three of these varieties is shown in the following summary of the 24 locations.

Summary of Regional Oat Tests (24 locations) in Ontario 1954

| Variety | Yield in Bus./Acre | Days to Maturity | Height Ins. | % Lodging |
|---|---|---|---|---|
| Garry | 74.8 | 88 | 37 | 15 |
| Rodney | 70.4 | 92 | 36 | 22 |
| Simcoe | 69.0 | 87 | 38 | 20 |
| Abegweit | 66.2 | 89 | 35 | 35 |
| Beaver | 64.4 | 88 | 37 | 25 |
| Ajax | 62.9 | 86 | 37 | 23 |
| Shefford | 62.6 | 84 | 40 | 55 |
| Clinton | 60.0 | 83 | 32 | 5 |

The variety Garry was consistently at or very near the top in yield at all locations. This plus its performance at this station the two previous years, indicates that Garry will probably increase very rapidly in this province.

Garry and Rodney were developed by the Laboratory of Cereal Breeding, Winnipeg; Simcoe was developed by the Ontario Agricultural College, Guelph; Shefford was developed by Macdonald College, Quebec. The latter variety does not appear to be adapted to Southern Ontario.

Varieties with the Clinton-type of crown and stem rust resistance suffered quite badly in Ontario this year while Beaver and Ajax which are the most widely grown varieties escaped with very little damage. This is due more to luck than the genotypes of these two varieties. It is fortunate that Garry and Rodney are becoming established since these varieties have excellent resistance to the races of crown and stem rust now in existence in this country.

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## IV. CONTRIBUTIONS FROM U.S.D.A. AND STATES

### ARIZONA

By Arden D. Day (Tucson)

### Oats in Arizona

Oats are grown more for winter pasture than for grain in Arizona. However, a number of varieties are being tested for grain production, some of which look very promising. Compartive yields of four of the more popular varieties are given in the following table:

The annual average yield of oat varieties grown at the Mesa Experiment Station, Mesa, Arizona

(Expressed in % of Palestine)

| Variety | Year | | | | Average |
|---|---|---|---|---|---|
| | 1951 | 1952 | 1953 | 1954 | |
| California Red | 108 | 90 | 81 | 82 | 89 |
| Markton | 88 | 84 | 62 | 71 | 75 |
| Palestine | 100 | 100 | 100 | 100 | 100 |
| Ventura | 109 | 100 | 84 | 92 | 95 |
| Yield of Palestine calculated in lbs./A. | 3063 | 3034 | 3820 | 4483 | 3600 |

A very common question among Arizona farmers is, "What variety of oats shall I plant?" This question can be answered in a general way by dividing the state into areas on the basis of elevation.

For 0 to 2000 Feet Elevation:

For plantings from November 15 to January 1 for grain production, Palestine is recommended. This is a red oat introduced from Palestine, which, because of its high yield, early maturity and short straw, has attracted considerable interest in Arizona. Ventura, an early to midseason oat with yellow kernels, also yields well at this elevation.

For 2000 to 4000 Feet Elevation:

Markton oats are recommended at this elevation for pasture plantings in September and October. Palestine and California Red are the two oat varieties that have given the highest grain yields in plantings made from December 1 to January 15.

For 4000 Feet Elevation and Above:

The two oat varieties recommended for spring plantings at elevations of 4000 feet and above are California Red and Colorado 37. California Red is a late maturing, red oat that is fairly resistant to lodging; Colorado 37 is a high yielding white oat that looks promising at the higher altitudes in Arizona.

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## ARKANSAS

by R. L. Thurman (Fayetteville)

The yields of oats at the Rice Branch Experiment Station, Stuttgart in 1954 were normal. The majority of the 1953-1954 effort was spent on the problem of breeder seed of varieties developed and released in Arkansas.

Seedlings of the Ferguson 922 variety were treated with Colchicine in 1952 in a study of winterhardiness. Two plants (second generation from the original Colchicine treated seed) from a May 1953 planting were saved for seed increase. The two plants continued to grow and exist in the greenhouse until April 1954 before producing seed (some sterility existed). Seed sown in two foot rows in the field in September 1953, from the same source of seed as the two plants, produced seed normally in the spring of 1954 but possessed some sterility.

Seed from the 1954 harvest were sown in a five foot row in the author's garden on July 1, 1954 and irrigated through the hot dry summer. Some of the plants were clipped in the early fall. On January 1, 1955 there was still no indication of heading, the unclipped plants had reached 15 inches in height and were very green. The lowest temperature recorded to date this winter was 12 degrees F. However, there was about 1 to 1½ inches of snow on the plants at the time of the low temperature. The first generation of the Colchicine treated seed was very winterhardy. The seed supply on hand of the material is zero.

It should be pointed out that the original seed used were labeled as Ferguson 922. The author is not sure if the seed were properly labeled and is sure that the seed contained a mixture of other varieties as shown by a 1953 field planting. The seed of the original lot of Ferguson 922 was later discarded.

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## CALIFORNIA

by C. A. Suneson (Davis)

### Briefs on Oat Production in California*

1. Oat grain generally is not a surplus crop in California.
2. About 70 percent of the California oat acreage is cut for hay.
3. Varieties generally rank similarly in hay and grain production.
4. Protein content of oat hay declines with advancing maturity of the crop.
5. Foliar diseases markedly affect the quality of hay.
6. Oats are a cool climate crop and should be sown to mature early.
7. Windrow harvest of grain is often desirable to minimize shatter losses.
8. Oats are becoming increasingly useful in dry land rotation with wheat and barley for practical control of certain root rots.
9. Avoid excessive lodging by not sowing too much seed.
10. Principal oat diseases are stem rust, crown rust, halo blight, and yallow dwarf virus.
11. Oat seed should be treated for control of loose and covered smut.
12. Palestine, despite disease, has been the top average producer in most areas. Breeding programs to produce rust resistant and better adapted forms of Palestine and Kanota are nearly completed.
13. Panicle blasting may be caused by yellow dwarf virus, heat-drought stress at flowering, or by untimely or excessive 2-4,D spraying.

*From "Selecting Oat Varieties for California" by C. A. Suneson and L. L. Davis

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# FLORIDA

by W. H. Chapman (Quincy, Florida) and
A. T. Wallace (Gainesville, Florida)

## Oat Breeding in Florida

In general, the 1953-1954 season was not as favorable for production of small grain crops as in previous years. There was sufficient moisture for early planting; however, dry weather during October and November lowered the yield of early winter forage. Heavy rains during December resulted in leaching and general poor growing conditions. Rainfall for the first five months of 1954 was 11 inches below normal. As a result grain yields were lighter and quality poorer than in previous years. Early varieties and selections such as Seminole produced satisfactory grain yields before being severely damaged by dry weather. There was no winter-killing in the nursery.

Crown rust is still the most important disease affecting oats in Florida. Races 213, 216 and similar races were widespread throughout the state and caused extensive damage to most commercial plantings of Southland oats. Although this variety cannot be recommended, the farmer can choose between crown rust resistant varieties such as Floriland, Sunland, and Seminole.

Approximately 80% of the oats in Florida are grown for grazing only. Much of the oats that are harvested for grain are grazed considerably. Since grazing delays maturity, crown and stem rust resistance are almost a requisite for the subsequent grain crop. Although no variety available for production in Florida carries resistance to both crown and stem rust, a large number of selections with combined resistance is in the yield tests this year. Preliminary tests indicate that one group of selections combine the Santa Fe type of crown rust resistance with resistance to prevalent races of stem rust.

In 1954 different sources of crown rust resistance from previous years were used. These include a number of P. I. selections from the World Collection. Parental types resistant to 7A were used extensively in the crossing program. As a result of these crosses there are rather extensive space planted $F_2$ nurseries at Quincy and Gainesville.

As a supplement to the breeding program, a rather large $X^2$ population of Southland and Floriland is being grown in Florida. This work was initiated by Dr. Wallace in cooperation with the Brookhaven National Laboratory.

The recurrent selection breeding program initiated last year at Gainesville is progressing satisfactorily. This program utilizes promising forage producing lines from the breeding nurseries at Quincy, Tifton, and Gainesville. Since oats are used extensively for forage, the intensified program dealing with developing high forage producing varieties, has materially strengthened the oat breeding program in Florida.

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## GEORGIA

by A. R. Brown (Athens)

Oats continue to be the leading small grain crop in Georgia. There were 685,000 acres of oats harvested in 1954 with an average yield of 31 bushels per acre. Dry weather during May caused test weights to be somewhat lower than usual.

Yields in the Uniform Fall Sown Oat Nursery ranged from 57 bushels per acre for Tenn. 909 X Bond: Tenn. Sel. 313-2 to 86.0 bushels for Desoto. Tenn. Sel. 286-8 and Tenn. Sel. 313-2 as well as Southland were attacked by stem rust, the former two rather severely. Stanton 1 was a close second in yield with an average of 85 bushels per acre.

As of January 21, 1955 very little winterkilling had occurred in the least hardy of the oat varieties.

The USDA Fall Sown Oat nursery was planted on October 22, 1954 in three inches of dust. The first rain after planting occurred November 4, 1954 causing a rather late emergence. All varieties came up to a good stand and was not hurt by the 19°F. weather which occurred around December 18, 1954.

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By S. A. Parham and D. D. Morey (Tifton)

The Coastal Plain area experienced the most severe drought in recorded history during 1954. There was a serious shortage of forage from both permanent and temporary summer pastures. Near failures of corn, peanuts and most hay and silage crops was common. Under these circumstances oats and other small grains were widely planted in the fall of 1954. This increase in grain acreage is a practice that is common in South Georgia when summer feed crops are short. With this use of small grains it is highly desirable to have varieties suited for both grazing and grain.

At this time (late January) oats and rye pastures have had enough rain and mild temperatures to produce much grazing throughout the Coastal Plain. Oats are remarkably healthy and few diseases have been noted. Nitrogen deficiencies have appeared and overgrazing is rather common, but with ample rainfall and mild temperatures small grains will again prove their value in this area.

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# IDAHO

By Frank C. Peter and Harland Stevens

The 1954 crop season was generally favorable for oat production with the exception of a period of unusually warm weather in May which hastened development at the expense of straw height and possibly yield. A late spring frost did not appear to damage oats but caused sterility in early varieties of barley and winter wheat. Stem rust was observed on early planted Markton checks. This was the earliest stem rust was ever observed in the area but there was no evidence of any yield reduction. Susceptible late planted genetic material was uniformly infected with stem rust. Many late tillers of oats planted June 1 or later were infected with downy mildew.

Yields were good in most irrigated areas. In the Aberdeen nursery C.I. 6613, C.I. 5347, Park, Exeter, C.I. 5346, Bannock, C.I. 5345, Rodney, Improved Garry, and Cody were the highest and produced yields ranging from 190.6 to 175.6 bushels per acre. Lodging was moderate in all 1954 oat nurseries. Overland and its derivatives had the least tendency to lodge of any group. Rodney, C.I. 5346, Bannock, and Shelby were the heaviest oats, producing 39.0, 38.5, 38.0 and 38.0 pounds per bushel respectively.

Cody was approved for production in Idaho in 1953 and seed made available in 1954. It is a selection from Victoria-Richland x Bannock, developed cooperatively by the USDA and State Experiment Stations in the Northwestern Region. Cody was originally released by the Wyoming Experiment Station in 1950 and Washington one year later. Cody is recommended for dryland areas and for light textured irrigated soils. Overland is recommended for fertile irrigated soils and is especially adapted for use as a companion crop. Marida is widely grown in the northern part of the state where it is used for hay as well as grain production.

The present breeding program includes the development of higher yielding short strawed varieties for growing under irrigation, improving the quality of high yielding oats for dry land, and developing increased resistance to shattering to reduce losses from combine harvest. No measurable losses are experienced from rust at present but all breeding material is tested for resistance to rusts, smuts and H. victoriae. The relationship of yield to tillering and other quantative characters is being investigated in cooperation with workers of the Iowa Experiment Station and the USDA.

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# INDIANA

By F. L. Patterson, J. F. Schafer, R. M. Caldwell, L. E. Compton, J. E. Newman, R. R. Mulvey and K. E. Beeson

## The Season

The 1954 growing season was an excellent one for oat production in Indiana. Near record yields were obtained for both winter and spring oats. The season can be best characterized as a mild and dry winter followed by a drier than normal spring and early summer with temperatures near normal for the spring and summer. These conditions allowed good winter oat survival in the southern one-third of the state, early spring development and early maturity before high summer temperatures developed. The dry spring permitted early seeding of the spring oat crop and allowed the crop to reach a stage of maturity less likely to be damaged by high temperatures in late June and July.

## Oat Diseases in 1954

The oat disease situation in Indiana in 1954 was directly related to the weather conditions. The early dry spring allowed farmers to plant early, giving the oat crop a head start on the rust diseases. This was followed by a cold, dry period in May which held back rust initiation and development more than it did the oat crop. As a result the rusts caused little damage in Indiana in 1954.

This cold May period was apparently related to another unusual disease occurrence, the presence at that time of bacterial stripe blight on early planted oats. This disease caused rather severe lesions which in association with drouth at this time resulted in considerable leaf damage on these large plants in early seedings. Subsequent warmer, wetter weather allowed the plants to recover quickly, and these vigorous early planted oats continued to be superior to later plantings which had not been affected by the disease.

The red leaf disease, although present, was not conspicuous as it had been in 1953. Septoria disease, which has been severe in areas both north and west of Indiana, continues to by-pass us, not having been prevalent in occurrence since 1952.

Smut was seldom found in oats, a situation which has existed for a number of years. Apparently specialized races of oat smuts are remaining in the regions where they are endemic and are not readily spreading from one geographic area to another.

## Advanced Performance Tests

Several selections from crosses of the parentages (1) Clinton[2] x Arkansas 674, (2) Clinton x Boone-Cartier, and (3) Nemaha x (Clinton x Boone-Cartier) were superior to standard varieties in over-state performance trials. These will be continued in over-state and Uniform Nursery trials in 1955.

## Clintland Oats

An estimated 300,000 to 320,000 bushels of registered Clintland oats produced in Indiana in 1954 is sufficient to seed about 12 percent of the oat acreage in the state in 1955. Seed sales were limited to Indiana for the 1954 crop. Seed volume should be sufficient following the 1955 crop to meet out-of-state demands.

Certified acreages of other recommended varieties in 1954 were: Dubois, 275; Benton, 389; Clinton 59, 5030; Clintafe, 1070 and; Mo. 0-205, 770.

## New Varieties Approved for Release

Two new spring oat varieties developed by Purdue University and the U.S. Department of Agriculture have been approved for release. Both varieties, CI 6642 and CI 6930, were in the North Central Nursery in 1954. Performance data and descriptions of the varieties have been furnished to other experiment stations in the North Central Region. Limited seed supplies have been made available for testing and increase.

CI 6642, Purdue 436A2-2-4-1, has been tested in uniform nurseries for 3 years. It is a selection from the cross Nemaha x (Clinton x Boone-Cartier). CI 6642 is similar to Clinton 59 in height, maturity and straw strength. It has been superior in test weight of grain but slightly lower in percent groats. It is intermediate in resistance to crown rust and is resistant to race 7 and related races of stem rust. CI 6642 compares favorably with Clinton 59 and Clintland in average performance in Indiana and offers a type of seasonal adaptation and a type of stem rust resistance which differ and are complementary to those of Clinton 59 and Clintland.

CI 6930, Benton $^{7}$ x Landhafer, has been similar to Benton in all characteristics except for crown rust resistance derived from Landhafer. It is expected that this variety will replace Benton in Indiana.

It is proposed that varietal names and publicity on the new varieties be withheld until the small grain field day at Purdue University in June, 1955. Your cooperation is requested.

## Varietal Recommendations

Small grain varieties recommended for seeding in Indiana in 1955 are described in Purdue Agricultural Experiment Station circular 407. Clintland, Clinton 59, and Benton are recommended for the northern half and Mo. 0-205 for the southern half of Indiana. Clintafe is recommended for the northern one-fourth of the state.

Dubois winter oats are recommended for the southern one-fourth of the state.

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## IOWA

By J. A. Browning, K. J. Frey, H. C. Murphy,
M. D. Simons, and S. C. Wiggans
(Ames)

### Stem Rust Resistance Genes from Irradiated Huron

Two strains of oats possessing stem rust resistance selected from irradiated Huron variety have been crossed with varieties containing known stem rust resistant genes to determine their identity. Both mutant genes have proven to be identical to the Richland gene present in Eaton, Rainbow and Richland varieties of oats. The Richland gene conditions resistance to races 7 and 7a of stem rust. In other crosses involving three stem rust resistant mutant lines by a susceptible strain, the segregation in the $F_2$ generation was on a monofactorial basis. One of these crosses involved resistance to race 8 while the others involved resistance to races 7 and 7a of stem rust.

### A preliminary report on the reaction of the World Collection of Oats to stem rust race 6

The World Collection of Oats has been tested in the seedling stage in the greenhouse for reaction to race 6 of the oat stem rust fungus. The reaction of most resistant entries could have been predicted on the basis of the variety Hajira in their parentage. Eight other entries were also found to be resistant or mixed in reaction. These were an unnamed entry from China (C.I. No. 2413), an unnamed entry from Manchuria (C.I. No. 2710), two unnamed hull-less entries from Africa (C.I. Nos. 3030 and 3031) and four selections of Kherson (C.I. Nos. 3037-3040). Appropriate crosses are being made to identify the genes conditioning resistance in each case.

### Races of crown rust identified in 1954

To date 18 races have been identified from 462 isolates of crown rust obtained from oats in uniform rust nurseries and other locations during 1954. Race 202, which attacks Anthony, Appler, and Bond, but none of the other new differentials, accounted for about 40 percent of the total, and was thus nearly twice as commonly identified as the next most prevalent race, 203. Race 203 made up 23 percent of the total, showing a gain of 8 percent over 1953. It differs from race 202 only by its ability to attack Ukraine.

Race 213, formerly regarded as the most common of the races attacking Victoria, fell from 14 percent in 1953 to nine percent in 1954. Race 258, which attacks Victoria, but not Bond, rose from three percent in 1953 to 10 percent in 1954, making it the third most prevalent race. Race 216, a Victoria race which also attacks Ukraine, also showed a little gain in 1954 and accounted for eight percent of the isolates that have been identified so far. None of the other races was identified more than a few times.

The discovery of race 263, which attacks Landhafer, Santa Fe, Trispernia, and Bondvic, in material obtained from Manitoba, Canada, in 1953 has been reported in the Plant Disease Reporter. Another culture, collected in Iowa in 1953, was tentatively identified as race 276 late in the spring of 1954. This has now been confirmed. Race 276 attacks all the varieties that eace 263 parasitizes, and also attacks Ukraine. Victoria is moderately resistant and Saia is highly resistant to both races 263 and 276. Neither of these two races has as yet been identified in material collected in 1954.

## Estimated yield reductions due to oat diseases in Iowa

Estimates of losses of production in the Iowa oat crop due to diseases have been made since about 1920. Many estimates have been backed by limited experimental data, while others fall more accurately under the heading of "guesstimates". Even when such estimates do not furnish accurate information regarding absolute losses, they do provide a good measure of the relative severity of diseases from year to year.

Estimated reductions in Iowa oat yields caused by oat diseases during the ten-year period 1945-1954 are given in Table 1. The changing variety picture must be kept in mind when the data are interpreted. Victoria derivatives were widely grown until Helminthosporium victoriae forced them to be withdrawn from commercial plantings. This disease was so serious that reductions in yield for 1945-1947 were sufficient to rank it as the third most serious disease during the ten-year period. Crown rust was of little importance while Victoria lines were being grown; however, as Bond lines became available crown rust returned as the number one oat disease in Iowa. In Table 1, "t" (trace) is a small variable estimate used to indicate that a given disease was seen but did little damage, and is arbitrarily averaged in as a 0.2% reduction in yield. Actually, in the case of relatively rare diseases, even this figure may be too high.

The committee used three methods in arriving at its annual estimates: (1) Observations in oat nurseries and fields over the state throughout the growing season; (2) data from seed treatment, soil fumigation and fungicide spray experiments as available, and; (3) comparisons of yield data from comparable yielding varieties which differ in disease reactions from widely distributed replicated nurseries across Iowa. The data and observations for the varieties were adjusted for acreage planted and losses were expressed as percentage of the total Iowa oat crop. It is hoped that the increased use of fungicides and the development (now in progress) and use of several isogenic and multigenic lines for genes conditioning reaction to different groups of crown and stem rust races will enable more accurate disease-loss estimates to be made.

## Tillering Studies in Oats

Experiments have shown that with later sowing of oats the decrease in yield usually experienced can be minimized by increasing the rate of seed sown per acre. The popular explanation for this is that the late planted oats do not tiller as abundantly as those planted early. In an experiment including 8 oat varieties grown at Ames, Iowa in 1954, the tillering rate per plant increased when the oats were sown between April 1 and May 6 but after this date it decreased. The application of nitrogen fertilizer to the soil at the time of

Table 1. Estimated reductions in Iowa oat yields caused by oat diseases during the ten-year period 1945-1954.

| Disease | Estimated reduction in average oat yields for Iowa (Percentages) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | Ave.[1] |
| Crown rust | 1.5 | t | t | t | 12.0 | 18.0 | 20.0 | 8.0 | 30.0 | 9.0 | 9.9 |
| Root necrosis | 5.0 | 2.0 | 4.0 | 10.0 | 3.0 | 10.0 | 12.0 | 8.0 | 8.0 | 6.0 | 6.8 |
| Helminthosporium victoriae | 5.0 | 25.0 | 32.0 | 1.0 | t | t | 0.0 | 0.0 | t | t | 6.4 |
| Septoria avenae | -- | -- | t | 0.5 | 0.5 | t | 2.0 | 15.0 | 2.0 | 3.0 | 2.9 |
| Stem rust | 3.0 | t | t | t | t | 2.0 | t | t | 10.0 | 11.0 | 2.7 |
| Red leaf | -- | -- | -- | -- | 15.0 | 0.5 | t | t | t | t | 2.7 |
| Helminthosporium avenae | 7.0 | 1.0 | 0.5 | t | t | t | t | t | t | t | 1.0 |
| Blast | 0.5 | 1.0 | 2.0 | t | t | 0.5 | t | t | 0.5 | 1.0 | 0.6 |
| Halo blight | 1.0 | 1.0 | 0.5 | t | t | 0.5 | 0.5 | 1.0 | 0.5 | t | 0.6 |
| Blue dwarf | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 0.5 |
| Scab | t | 0.5 | 0.5 | t | 0.0 | 0.0 | 0.5 | 0.5 | t | 0.5 | 0.3 |
| Smut | t | t | t | t | t | t | t | t | t | t | 0.2 |
| Leaf spot (scald) | -- | -- | -- | -- | -- | -- | -- | -- | t | t | 0.2 |
| Anthracnose | -- | -- | 0.5 | t | t | t | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| All diseases | 23.4 | 31.1 | 40.8 | 13.1 | 31.9 | 32.5 | 36.0 | 33.5 | 52.2 | 32.2 | 32.6 |
| | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. | Bu. |
| Estimated acre yield | 38.5 | 37.5 | 33.0 | 45.0 | 38.0 | 41.0 | 33.0 | 35.0 | 25.5 | 38.5 | 36.5 |
| Potential acre yield | 50.3 | 54.4 | 55.6 | 51.8 | 55.8 | 60.7 | 51.6 | 52.6 | 53.3 | 56.8 | 54.3 |
| Loss per acre | 11.8 | 16.9 | 22.6 | 6.8 | 17.8 | 19.7 | 18.6 | 17.6 | 27.8 | 18.3 | 17.8 |

[1]Averages for years recorded.

sowing produced a smaller number of tillers per plant than when the fertilization was delayed for two or four weeks. It appeared that with planting rates of 3 and 5 bushels per acre the maximum number of tillers was produced with 40 pounds of nitrogen. However, at a 1 bushel planting rate the number of tillers continued to increase when up to 80 pounds of nitrogen per acre was applied. In order to distinguish the difference between varieties with respect to tillering capacity, it has proven necessary to use a high level of nitrogen fertilization. In a hydrophonics experiment all six oat varieties tested, C.I. 5298, Huron, Clintland, Missouri 0-205, Craigs afterlea, and Minor, produced approximately one tiller per plant when little or no nitrogen was supplied. When more nitrogen was supplied than was required for maximum plant growth, Missouri 0-205, Clintland, and C.I. 5298 produced about 5 tillers per plant while Craigs afterlea and Minor produced only 2. Many of the fields planted to oats in Iowa are so deficient in nitrogen that regardless of planting rate each plant produces only one tiller.

## Effect of Test Weight Upon Yield of Oats

After the 1953 growing season in Iowa, questions were asked by seed producers and farmers about the desirability of using the low test weight seed produced that year. The test weight was reduced by stem and crown rust as much as 15 pounds per bushel. Test weights of from 20 to 22 were not at all unusual. An experiment was conducted in 1954 to determine the effect of test weight of seed oats upon the yield of the resultant crop. Lots of Cherokee, Clintland, Missouri 0-205 and Branch varieties of oats were separated with a gravity cleaner into test weight samples at approximately 5 pound intervals over the range from 17 to 38 pounds per bushel. The quantity of seed planted from each plot was adjusted to give the same number of viable plants per acre. It was found that the varieties, Cherokee, Clinton, and Branch, grown from seed weighing from 22 to 25 pounds per bushel produced as good yields as that which weighed 37 to 38 pounds. Any test weight below 20 pounds, however, produced a significant reduction in yield. With Missouri 0-205 variety the yield increased in proportion to the test weight of the seed oats up to about 32 pounds where the maximum yield was reached. There was a positive correlation between the test weight of the seed planted and the test weight of the crop produced.

## Oat Seed Germination at Various Intervals After Fertilization

Greenhouse studies indicate that it may be possible to germinate oat seeds harvested 4 to 8 days after fertilization without use of embryo culture techniques. Seed from five oat strains were harvested 4, 8, 12, 16, 20, and 24 days following fertilization, chilled for one week at 4°C and germinated at 20°C. One strain germinated 67% when harvested 4 days after fertilization and 73% after 8 days. The seeds of a second strain did not germinate unless allowed to develop on the plant at least 24 days after fertilization. Precocious harvest of oat seeds with subsequent cold or drying treatments may prove useful in decreasing the time needed to produce new generations of oats.

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# KANSAS

by A. J. Casady and E. G. Heyne, Agronomy; C. O. Johnston, E. D. Hansing, and W. C. Haskett, Plant Pathology; and W. M. Ross, Ft. Hays Branch Station

Weather conditions from May 1 through early June were perfect for oats, and yields were exceptionally good. The average yield for the state was 32.5 bushels per acre, as compared to 21.5 bushels per acre for 1953. Slightly over a million acres were harvested in the state with a total production of nearly 36.25 million bushels. This is approximately 13.5 million bushels over the 1953 production and approximately 11 million bushels above the 1945-1954 average. In value, oats ranked fourth for the grain crops produced in Kansas in 1954.

The list of recommended oat varieties has changed since the 1953 report. At the Annual Branch Station Conference, January 5-7, 1955, it was voted to place Andrew on the recommended list and remove Clinton. In many respects, Clinton has performed well in Kansas, but for a number of years it has been lowest in yield of the recommended varieties. Andrew, on the other hand, has been one of the highest yielders included in the variety tests. The recommendation of Andrew also gives Kansas a second variety resistant to stem rust race 7, the other being Mo.-0-205. With this change in recommendation, the Kansas recommended varieties are Mo.-0-205, Andrew, Cherokee, Nemaha, Kanota, and Neosho where Victoria blight is not a problem.

Neither crown or stem rust was abundant enough to cause any appreciable damage to the oat crop in 1954. Little damage from Victoria blight was observed since nearly all of the acreage in eastern Kansas was planted to resistant varieties. Smut was apparently not a factor in oat production in 1954.

The Uniform Red Oat Nursery is grown at Manhattan and Hays, and the North Central Uniform Nursery is grown at Manhattan. Promising entries in these nurseries will be put in advanced tests for more extensive testing. The Special Winter Oats Nursery is planted each fall at Mound Valley and Hutchinson. Kansas does not recommend winter oats, but a hardy type might find a place in southern Kansas.

The Kansas oat breeding program is small at present and is mostly centered at Manhattan. An attempt is being made to incorporate better crown and stem rust resistance into Neosho and Richland-Fulghum types by backcrossing. The phase of the program dealing with the Richland-Fulghum type is now in the first backcross, while the part dealing with Neosho is only in the $F_1$ stage.

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## MAINE

by L. H. Taylor (Orono)

The 1954 growing season in Maine was wet, cold, and relatively unfavorable for grain production. Lodging due to two fall hurricanes were extensive. A considerable portion of the oat acreage was not harvested as the grain was down and harvesting weather was very poor.

More Septoria was present than we have seen in previous years in Maine. Although it could be found on all varieties it was especially damaging to Clarion. In the trials the varieties most severely infected by Septoria were Clarion, Mo. 0-205, C.I. 5319, C.I. 6943, and C.I. 6765. The least Septoria was on Abegweit, Victory, C.I. 6641 and C.I. 6932. The highest yielding oat variety at both Orono and Presque Isle was Garry, C.I. 6662.

Wireworms damaged grain fields in several areas of the state. In a few cases the oat crop was completely destroyed. Crown rust was prevalent in Central and Southern Maine and stem rust in Northern Maine but losses from these diseases were not severe for the most part. Dr. Livingston of the Plant Pathology Department found the aecial stage of stem rust on barberry near a field of Clinton 59 oats in Aroostook County that was very severely damaged by stem rust. To my knowledge, this is the first report of barberry serving as an alternate host to stem rust in the Aroostook oat growing area.

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## MASSACHUSETTS

By E. K. Walrath and I. K. Bespalov, Field Seed Research, Eastern States Farmers' Exchange

### Highlights of Oat Hull Picking 1952-54

1. The entries in the 1952 Uniform NE States Oat Nursery at Feeding Hills, Massachusetts ranged from 20.5 to 37.5 percent hulls. Between entries with the same acre yields as threshed, there were differences as high as 5.7 bushels or 181 pounds more groats per acre. With a net energy value of 116.7 therms per cwt. of groats worth $4.00 cwt. at current value basis, C. L. Bulk, Boston, the oats with the lower hull content were worth $8.45 more per acre. The range in kernel weight was from 18.5 grams to 25.7 grams per 1,000 kernels. The percent of naked kernels from 8.0 to 36.8 of the threshed samples.

2. In 1953 under drought conditions the greatest difference between entries with the same yields basis 32 pounds per bushel was 2.3 bushels of groats worth $3.45 more in net energy value.

3. In 1954 there was very little injury from disease at Feeding Hills, Massachusetts in contrast to the very severe injury from rust at Burlington, Vermont and the intermediate condition at Presque Isle. These two stations furnished us seed from their uniform trials for comparable determinations of

percent hulls, weight of 1,000 kernels and percent of groats in the sample. These data have been sent to Dr. F. A. Coffman and the two Experiment Stations.

4. The range in hull percentage for the three locations was:

| | High | Low | % Entries with over 30% hulls |
|---|---|---|---|
| Maine | 31.1 (Tama) | 19.9 (Roxton) | 3 |
| Vermont | 43.7 (Victory) | 25.3 (CI 6937) | 62 |
| Massachusetts | 34.0 (Tama) | 26.0 (Roxton) | 23 |

5. The range in percent of naked seed in the samples was:

| | High | Low | % Entries above 10% Groats |
|---|---|---|---|
| Maine | 25.0 | 0 | 33 |
| Vermont | 2.0 | 0 | None |
| Massachusetts | 42.0 | 0 | 47 |

6. The ten named varieties with the lowest hull content were:

| Maine | | Massachusetts | | Vermont | |
|---|---|---|---|---|---|
| Roxton | (19.9%) | Roxton | (26.0%) | Rodney | (25.5%) |
| Shefford | | Clintland | | Roxton | |
| Clintland | | Clarion | | Shefford | |
| Beaver | | Mohawk | | Clintland | |
| Shelby | | Shefford | | Mohawk | |
| Simcoe | | Mo. 0-205 | | Beaver | |
| Abegweit | | Clinton | | Garry Sel. | |
| Clinton 59 | | Clintafe | | Clinton 59 | |
| Mo. 0-205 | | Fortune | | Clintafe | |
| Clintafe | (23.6%) | Beaver | (29.5%) | Mo. 0-205 | (30.3%) |

7. The ten named varieties with the highest acre yield of groats, basis the threshed sample were: (Acre value net energy at 4 cents per therm.)

| Maine | | Vermont | | Massachusetts | |
|---|---|---|---|---|---|
| Imp. Garry | $77.88 | Garry Sel. | $53.30 | Simcoe | $82.17 |
| Garry Sel. | | Imp. Garry | | Mo. 0-205 | |
| Abegweit | | Rodney | | Sauk | |
| Beaver | | Simcoe | | Abegweit | |
| Simcoe | $67.31 | Beaver | $37.44 | Fortune | $77.88 |
| Clinton 59 | | Abegweit | | Clinton 59 | |
| Fortune | | Clinton 59 | | Shelby | |
| Ajax | | Tama | | Clintland | |
| Craig | | Ajax | | Rodney | |
| Mohawk | $62.16 | Clintland | $32.72 | Ajax | $74.45 |

8. Entries with the same test weights had a wide range in the percent of hulls. With a 35# test weight in Maine the spread was 9.2%; in Vermont 9.5% in the 28# grouping; and in Massachusetts 6.0% in the 31# test weight grouping.

9. Very few entries were good in all four measurements of quality; low percent of hulls, high test weight, heavy kernels and high acre yield of groats.

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## MICHIGAN

by J. E. Grafius and R. L. Kiesling

Michigan Oat Breeding Program

The oat breeding program in Michigan is based on adding disease resistance and straw strength to Northern oat types such as Huron.

Fundamental factors involved in straw strength are being investigated. It has been found that a correlation of .38 (just short of P .01) existed between $cL_r$ factor notes taken at East Lansing and the lodging that occurred at Ames. The correlation between $cL_r$ factor notes at East Lansing and lodging at Lafayette was however, zero. The lodging at Lafayette was presumably of a different nature (due to varietal differences in a plastic soil) as it did not correlate with the lodging at Ames. It is believed that a torque measurement such as the $cL_r$ factor taken when the soil was soupy would also measure the type of lodging that occurred at Lafayette.

Work is continuing on resistance to Septoria with varieties being tested against Michigan isolates of this pathogen. Some relationship between after ripening lodging and Septoria readings has been found.

Field observations indicate Red Leaf may be one of Michigan's more serious diseases and further studies are being carried out.

Local seed treatment nurseries are conducted for testing new products under Michigan conditions.

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## MINNESOTA

by E. C. Stakman, D. M. Stewart, and B. J. Roberts[1]

### Preliminary Report on Physiologic Races of Puccinia graminis avenae in the United States in 1954

The most important development with respect to prevalence of races of Puccinia graminis avenae is the increase in race 7A. Race 7A is like race 7 but has the additional ability of attacking Rodney, Canuck, and other varieties which have the "Canadian" type of resistance. Identification on these varieties must be made at temperatures below 80°F. since they become susceptible to many

[1]U.S. Department of Agriculture, ARS, Plant Pest Control Branch and Field Crops Research Branch; and Minnesota Agricultural Experiment Station.

races at higher temperature. Up to the present time 7A has been identified from 18 states, from Texas to Minnesota, North Dakota and Montana, and eastward to the southeastern and middle Atlantic states. Race 6 has been identified from Maine, New Hampshire, Pennsylvania, and from barberry in JoDaviess County, Illinois. Race 7 (and 12) comprises, up to the present, almost 60 percent of all isolates; race 8 (and 10) about 15 percent; and race 2 about 13 percent. It is suggested that 7A may now be used commonly in varietal testing, along with the other common races, as it is widely distributed and fairly abundant, but race 6 should still be used only in the winter in the north in rigidly controlled greenhouses.

Inoculum of the common races, including 7A can be furnished by the Federal Rust Laboratory, St. Paul, Minnesota.

It would be helpful if requests for races of oat stem rust specified the time and place where the material is to be used, whether in the greenhouse or field, and whether for varietal testing or genetic studies.

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## MISSISSIPPI

by Donald H. Bowman (Stoneville)

Mississippi oat production set a new record high in 1954. Over 17 million bushels were harvested from 427,000 acres. The average state yield of 40 bushels per acre equaled the record high set in 1953. Over one-half of the Mississippi oat acreage was in the Delta region where yields of 60 to 70 bushels per acre were quite common and yields of over 80 bushels not uncommon. For the second straight year diseases were negligible.

Prospects at mid-January are excellent for another good crop. Acreage has increased over 1954 plantings and will probably exceed 350,000 acres in the Delta.

Dr. H. H. Luke has recently joined the staff at the Delta Station after completing his Ph.D. at Louisiana State University. He will work in the oat improvement program, concerning himself primarily with the disease resistance phase.

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# MISSOURI

by J. M. Poehlman and C. L. Koehler (Columbia) and Carl Hayward (Pierce City)

## Performance in 1954

The yield and production of oats set a new high record in Missouri in 1954. "Favorable weather resulted in 41.5 bushel acre-yield which is 10.5 bushels above the previous record of 31 bushels set in 1946 and 1947," according to a recent Missouri crop report. (The authors would like to attribute part of the high yield to the excellent performance of the Mo. 0-205 variety which is now widely distributed in Missouri.) Nevertheless it was a very favorable season for oats in spite of the fact that precipitation was deficient by 15 to 20 inches during 1954. Weather conditions favoring these high yields may be outlined as follows:

a. Mean temperatures averaging 10-15 degrees above normal during February.

b. Dry soil conditions which permitted a large part of the oat acreage to be seeded in February.

c. Precipitation above normal (although not in excessive amounts) during April and May.

d. Temperatures below normal during May.

e. No loss before harvest either by disease or storm damage.

Summing up the whole situation, we might say that the early planting and long favorable growing season, the good varieties used, and the increased use of fertilizer all contributed to the high yield.

Columbia and varieties of Columbia origin, Mo. 0-200 and Mo. 0-205, again demonstrated their ability to ripen during a hot, dry June and produce heavier and brighter seed than varieties without Columbia parentage, even though the latter may be as early in maturity.

Two varieties are now recommended in Missouri 0-205 and Andrew. Results of four tests in Missouri in 1954 are listed below:

| Variety | Date Headed | Height inches | Test Weight lbs./bu | Yield bu/acre | Yield 7 year average (38 tests) |
|---|---|---|---|---|---|
| Mo. 0-205 | 5/29 | 36 | 34.6 | 64.4 | 57.3 |
| Andrew | 5/29 | 35 | 34.0 | 63.0 | 54.8 |
| Cherokee | 5/27 | 34 | 34.5 | 57.7 | 49.6 |
| Clinton | 5/31 | 34 | 33.0 | 56.4 | 47.6 |
| Clintland | 5/31 | 35 | 33.6 | 56.3 | |

## Future Breeding in Missouri

Breeding work is based on improvement of Mo. 0-205 oats. Three areas of improvement are being given consideration: shorter and stiffer straw, better seed quality, and additional stem rust resistance.

## Winter Oats in Missouri

Winter oats have received more than usual attention by farmers in Southern Missouri as a result of three relatively mild winters. Winter oats are considered a safe crop in Southeast Missouri only, but this is a cash crop area and there is little interest in oats. It is believed the new Cimarron variety may have a place in this area because it is so early and could easily be followed by soybeans in a double cropping system. Elsewhere across the southern border of Missouri winter oats remain an uncertain crop.

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## NEW HAMPSHIRE

by Leroy J. Higgins (Durham)

The 1954 uniform Northeastern States nursery oat trials were again conducted in Durham. Thirty-six varieties were grown in three replications for each variety. Unlike 1953, when New Hampshire experienced an extended mid-semester drought, 1954 turned out to be one of the wettest summers on record.

The following Durham comparative rainfall and temperature data are of interest:

Rainfall in Inches

| | April | May | June | July | August | September | 6 Months Total | Average per month |
|---|---|---|---|---|---|---|---|---|
| 1953 | 5.48 | 3.44 | 0.37 | 2.19 | 3.70 | 1.49 | 16.66 | 2.78 |
| 1954 | 4.42 | 12.00 | 2.62 | 3.26 | 5.51 | 8.40 | 36.21 | 6.04 |
| Mean (over 50 years) | 3.57 | 2.87 | 3.47 | 3.37 | 3.75 | 3.73 | 20.26 | 3.38 |

Temperature in F. Degrees

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1953 | 46.2 | 57.5 | 66.9 | 70.9 | 68.2 | 62.8 | 372.5 | 62.08 |
| 1954 | 47.7 | 53.7 | 64.9 | 68.8 | 66.8 | 59.7 | 361.6 | 60.27 |
| Mean (over 50 years) | 43.8 | 54.7 | 63.6 | 68.1 | 66.4 | 59.2 | 355.8 | 59.30 |

The oats made good growth up to heading but birds ruined the crop. Never before has this happened and was perhaps due to the fact that this oat stand was the only one in the area. The harvesting and threshing operations were carried through for forage and grain yield but the results were unreliable.

Field observations showed an average amount of disease present. The oats were ready to harvest about five days later than in the previous dry year. Both the Improved Garry and Garry Selection looked good as did the New York Selection 611B-176-9. Clarion again was more favorable than Clinton.

The leading oat varieties grown by New Hampshire farmers were Clarion, Ajax, and Clinton. Due to the Green Pastures Program, more oats are pastured off than ever before.

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## NEW JERSEY

by Steve Lund and Donald A. Schallock (New Brunswick)

Winter oat yields were excellent and very little winter injury was reported in the winter oat area. LeConte continues to look well but Arlington produces higher yields where lodging is not a problem. In 5 tests scattered over the winter oat area, Arlington yielded 97.0 bu. with a test weight of 40 lbs. and LeConte yielded 92.0 bu. with a test weight of 39 lbs.

Clarion and Craig continue to yield well in spring oat tests. Clinton, however, is the only spring variety recommended in this state.

More emphasis is planned on the cereal work at Rutgers with the addition of the senior author to the staff this past fall.

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## NEW YORK

by N. F. Jensen, G. C. Kent, R. B. Musgrave and L. J. Tyler (Ithaca)

The estimated harvested acres of oats in New York increased from 670,000 in 1953 to 717,000 in 1954. The State average yield per acre was 37.5 bushels and total production was estimated at 26,888,000 bushels. All production was of spring oats. Both crown and stem rust were present in damaging amounts throughout the State. Clinton and Mohawk, still the dominant varieties, showed high susceptibility and obvious damage.

Identification of rust collections made during the year have not yet been completed.

Tests of oats at 13 locations in the State during the year gave the following yield results:

| Variety | Average yield Bu./Acre |
|---|---|
| Rodney | 70.8 |
| Garry | 70.2 |
| N.Y.611B-176-9 | 70.1 |
| Sauk | 68.7 |
| Ajax | 66.6 |
| Beaver | 59.2 |
| Craig | 58.6 |
| Clintafe | 56.8 |
| Clarion | 56.7 |
| Mohawk | 50.5 |
| Advance | 50.5 |
| Clintland | 49.7 |

The Garry increase program, begun two years ago with an Arizona winter planting, is well under way but seed will not be available in any large quantity until the spring of 1956. Admittedly, we would like to be one, or even two years, farther advanced on this program. For 1954 we will have to rely on present varieties, for the most part, and particular emphasis is being given to early planting as a means of minimizing possible rust losses. Present recommended varieties are Mohawk, Clinton, Craig, Ajax and Beaver. It is expected that Garry and Rodney will play an important part in oat production in New York after 1955.

Breeding for resistance to oat rusts is greatly hampered at the Cornell Station by inadequate greenhouse facilities. All concerned agree that work with new potentially dangerous rust races must not be done in the field. Increased attention is being given to the development of varieties having an agronomic type compatible with modern farming practices. This involves lodging resistance, yield, quality, height, and maturity, all in relation to high fertility levels of the soil. The Agronomy Department has pioneered in this concept of maximum yields.

A high priority in the breeding program is given to work with winter oats in an attempt to develop greater cold resistance or winter hardiness. It is too early to report any results but work to date has provided some interesting and promising leads. Studies up to this time have been concerned with screening plant material for cold resistance, and attempts to induce variation involving this character through the use of such techniques as hybridization and radiation treatment. Perhaps five years of this kind of preliminary work will provide the answer as to whether we can go much beyond presently available levels of hardiness in winter oats. (Jensen)

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Field experiments were continued in 1954 on oats to determine the effect of rate and date of application of various forms of nitrogen fertilizer. Ammonium nitrate, anhydrous ammonia, 40% nitrogen solution and 32% urea-ammonium nitrate solution were applied for Craig Oats at 0, 20, 40 and 60 pounds of nitrogen per acre. There were two dates of application (at planting and at 5" - 8" stage of growth) of the ammonium nitrate and the 32% solution. Corn fertilized with 40-40-40 preceded both of the field tests - one on an Erie Channery silt loam soil (limed to pH 6.8) and the other on a Lima silt loam. Sowing dates were May 20 and May 18, respectively.

Nitrogen increased the grain yield from 64.5 Bu./A on the check to 75.6 where 60 lbs. of nitrogen as anhydrous ammonia had been applied preplant to the Erie soil. On the Lima soil, however, nitrogen additions decreased yields as much as 14 Bu. down to 40.7 Bu./A. Dry weather, leaf rust, and Army worms were factors interacting with nitrogen fertilization to cause the lower yields on the Lima soil.

The four-trial average for the two years of this study indicates that Anhydrous Ammonia and the 40% Solution are the best sources of nitrogen for oats. In general the response to the 20 pound rate has been best but good profits have been realized from 60 pounds of cheap nitrogen coming from Anhydrous and the 40% Solution. To date there has been no advantage in delaying nitrogen fertilization to the 5" to 8" stage. (Musgrave)

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As a part of the oat improvement work at Cornell a test of the relative susceptibility of oat varieties is annually conducted on the station grounds. The purpose of this test is to keep informed of resistance levels in varieties of current or potential importance, to determine the resistance of new selections from the breeding program, and to search for and evaluate new sources of resistance. The oats are tested for their reaction to mixed biotypes of Ustilago avenae and U. levis. Some of the results from these tests over the past five years on varieties which may be of interest to plant breeders and plant pathologists are shown in the following table:

Relative susceptibility of some oat varieties to *Ustilago avenae* and *U. levis*[a]

| Variety | Percentage of smutted culms | | | | |
|---|---|---|---|---|---|
| | 1950 | 1951 | 1952 | 1953 | 1954 |
| Cornellian | 56.0 | 43.0 | 31.0 | 49.0 | 21.0 |
| Andrew | 5.0 | 7.0 | -- | -- | -- |
| Advance | 5.0 | 6.4 | 0.0 | 1.4 | 1.9 |
| Ajax | 15.0 | 31.0 | 27.0 | 44.0 | 19.0 |
| Beacon | -- | 39.0[c] | 25.0[d] | -- | -- |
| Beaver | 21.0 | 27.0 | 18.0 | 40.0 | 17.0 |
| Branch | -- | 3.5 | 0.0 | 1.2 | 0.0 |
| Clarion | -- | -- | -- | 0.0 | 0.0 |
| Cherokee | 3.0 | 1.7 | -- | -- | -- |
| Clintafe | -- | -- | 22.0 | 26.0 | 9.0 |
| Clinton | 11.0 | 6.0[b] | 2.0[b] | -- | -- |
| Clintland | -- | -- | -- | 7.0 | 4.0 |
| Craig | 0.0 | 6.0 | 0.6 | 3.2 | 0.0 |
| Erban | 16.0 | -- | -- | -- | -- |
| Garry (Canada) | -- | -- | 0.0 | -- | 0.5 |
| Garry (Sel. #5) | -- | 2.0 | 2.0 | 4.9 | 0.4 |
| Goldwin | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ithacan | 30.0 | 37.0 | 20.0 | -- | -- |
| Lenroc | 37.0 | 28.0 | 20.0 | -- | -- |
| Mo.-0205 | -- | -- | -- | 0.7 | 0.5 |
| Mohawk | 14.0 | 7.0 | 3.0 | 27.0 | 4.0 |
| Palestine | -- | -- | -- | -- | 0.0 |
| Rodney | -- | -- | -- | -- | 0.4 |
| Sauk | -- | -- | -- | 20.0 | 2.0 |
| Shelby | 3.0 | 6.0 | -- | -- | -- |
| Simcoe | -- | -- | -- | 74.0 | 19.0 |
| Sturdy | -- | -- | 35.0 | 57.0 | 12.0 |
| Upright | 45.0 | 24.0 | 24.0 | -- | -- |
| Vicland | -- | -- | 0.0 | -- | -- |
| Victory | 46.0 | 24.0 | 31.0 | 53.0 | 21.0 |
| Zephyr | 8.0 | 5.0 | -- | -- | -- |

[a]At least 90 percent *U. avenae*.

[b]Clinton Sel. 59.

[c]Average of 7 Beacon selections.

[d]Average of 13 Beacon selections.

The seed is inoculated with spores that are produced on plants grown in the greenhouse during the winter. Germinability of spores used for inoculum in each of the five years has exceeded 90 per cent. Inoculation of the seed is accomplished by means of the vacuum method and the inoculated seed is dried immediately. The inoculated seed is planted in the field, usually two replicates, without having induced germination of the seed-harbored spores before planting. Inoculated seed is planted in the field in late spring after soil temperatures have become warm and periods of heavy spring rainfall have passed. (Tyler and Jensen)

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## NORTH CAROLINA

by T. T. Hebert, G. K. Middleton, and W. H. Rankin (Raleigh)

A record-breaking oat crop was produced in North Carolina in 1954. An average yield of 39.0 bushels per acre was harvested on 523,000 acres. The yield is one-half bushel higher than the previous high of 38.5 bushels per acre produced in 1953. A dry fall resulted in poor stands in some sections of the state, but the winter and spring weather was very favorable for oat production.

Disease losses were small (estimated 4%) in 1954. Helminthosporium avenae was the most important pathogen. Victoria blight and crown rust was of minor importance even though most of the varieties grown are Victoria derivatives.

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## NORTH DAKOTA

by T. J. Conlon (Dickinson)

In the 1954 planting of the North Central Uniform Oats Nursery at the Dickinson Experiment Station the five highest yielding entries were: C.I. 6537, Clinton x Ukraine; C.I. 6441, Clinton x Marion; C.I. 6936, Landhafer x (Mindo x Hajira-Joanette) x Andrew; C.I. 6939, R.L. 1273 x Spooner and C.I. 6938, Forward x Victoria - Richland. Yields ranged from 48.4 to 46.5 bushels per acre for these five entries.

Stands were good and initial growth throughout the cool May and June weather was very good. The relatively low yields were a product of a hot, droughty July when only .59 inches of rainfall were recorded for the month. Average precipitation for July here is 2.19 inches.

Judging from varietal reactions, oat stem rust, races 7, 7a and 8 were all present but did little damage because the hot, dry weather retarded the development of the rust.

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## OKLAHOMA

by R. G. Dahms, A. M. Schlehuber, and E. A. Wood, Jr.; Oklahoma Agricultural Experiment Station in cooperation with the U. S. Department of Agriculture

### The Effect of Time of Greenbug Infestation on Injury to Spring-seeded Oats

Studies were conducted at the Oklahoma Agricultural Experiment Station during 1954 to determine the effect of the greenbug, Toxoptera graminum (Rond.), on the yield of two varieties of spring-planted oats when infestations occurred early, late, and during the entire season.

Although the initial infestations for the two varieties of oats, Andrew and Cimarron, were about the same for each comparison, the latter always had much higher greenbug populations and greater leaf injury when subsequent counts were made. In spite of this, Cimarron had fewer plants killed, and much smaller reductions in yield than Andrew when based on the number of greenbugs present. This was apparently due to the ability of Cimarron to recover, as yields were proportionately much higher for this variety than for Andrew when the greenbugs were removed early, whereas those following late and all-season infestations were not significantly different for the two varieties. Injury was much greater when plants were infected soon after emergence than at a later stage.

Tests were also conducted to determine the effect of seed treatment with demeton on the yield of these two varieties of oats. The average reduction was 1.18 and 0.22 pound per acre for each greenbug per foot, respectively, for Andrew and Cimarron oats.

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## PENNSYLVANIA

by Clarence S. Bryner (State College)

The 1954 spring oat season was generally favorable in the major oat growing sections. Average acre yields were up to 43 bushels, a new high, six bushels more than the 37 bushel average of 1953. Production was 33,411,000 bushels from 777,000 acres. The 1953 acreage was 740,000 acres.

Clinton 59, Clinton 11, Clinton 11-25, Ajax, and Zephyr are the recommended varieties of spring oats.

Results of Spring Oat Rod-Row Research Trials

| Variety* | 4 Trials 1953 Average Yield | 3 Trials 1954 Average Yield | 2 Year Average Yield |
|---|---|---|---|
| Craig | 65.4 | 71.8 | 68.6 |
| Garry | 63.7 | 68.7 | 66.2 |
| Ajax | 57.9 | 71.1 | 64.5 |
| Can. Beaver | 59.7 | 66.4 | 63.1 |
| Rodney | 61.1 | 62.2 | 61.7 |
| Clinton 59 | 59.1 | 63.9 | 61.5 |
| Zephyr | 58.9 | 64.1 | 61.5 |
| Clarion | 59.0 | 63.3 | 61.2 |
| Mo. 0-205 | 60.0 | 62.1 | 61.1 |
| Fortune | 55.6 | 66.5 | 61.1 |
| Sauk | 55.1 | 65.8 | 60.5 |
| Clintland | 55.8 | 60.0 | 57.9 |
| Clinton 11-25 | 56.0 | 59.7 | 57.8 |
| Larain | 58.8 | 53.9 | 56.4 |
| Patterson | 55.2 | 57.0 | 56.1 |
| Mohawk | 56.1 | 50.9 | 53.5 |
| Clintafe | 50.5 | 56.3 | 53.4 |
| Shelby | 59.5 | | |
| Clinton | 58.8 | | |
| Exeter | 57.6 | | |
| Abegweit | 57.4 | | |
| Waubay | 56.9 | | |
| Roxton | 53.9 | | |
| Sun 7 | 46.1 | | |
| Elmhurst | 44.8 | | |

* Yield given in bushels per acre
Only data on named varieties given

## Winter Oats

Winter oat acreage is increasing markedly in the Southeastern part of the state. Yields reported have been high and considerably above those obtained from spring oats in that section. LeConte and Dubois are the recommended winter varieties. Dubois appears to be relatively winter hardy and outyields LeConte when winterkilling is a factor. Straw of Dubois is not stiff enough for planting on the more fertile soils.

Good differential winterkilling was secured on the Hardy x Hardy cross progenies furnished by F. A. Coffman. Eighty plants survived in 41 rows of the 283 rows planted. Some loss occurred through rodent damage.

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## SOUTH CAROLINA

by E. B. Eskew and R. W. Earhart (Clemson)

A small grain improvement project is being initiated by the South Carolina Experiment Station. This will be a cooperative effort by the Agronomy Department (under the supervision of John B. Pitner) and the Botany Department (under the supervision of G. M. Armstrong) of the Clemson Agricultural College.

The agronomic objectives are to develop small grain varieties which are high-yielding, of desirable agronomic types, and resistant to the diseases which are prevalent in the state. Strains and varieties of small grains will be evaluated as to their ability to provide high yields of good quality forage. The pathological effort will be directed towards establishing adequate control of smuts, rusts, and the Helminthosporium-diseases by prevention, treatment, or breeding.

Lines of small grains having resistance to certain disease have been planted in nurseries at Clemson and Blackville. This material is to be evaluated with regard to desirable agronomic characteristics for eventual utilization in the breeding program. Yield tests with oats, wheat, and barley have been planted at Clemson, Blackville, and Florence. In addition, yield, winterhardiness, and disease nurseries have been planted at Clemson and Blackville in cooperation with the U.S.D.A.

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## SOUTH CAROLINA

by S. J. Hadden and H. F. Harrison (Hartsville)

Growing conditions for oats in the winter of 1953-54 were quite favorable from the standpoint of crop production and breeding. A timely freeze permitted the elimination of many non-hardy lines, yet did not damage the farm crops. However, a severe drought beginning in April and extending throughout the maturation period (except for one rain-and windstorm in mid May) considerably reduced both total yield and test weight in this area.

Disease conditions in inoculated nurseries were satisfactory for the desired selection and elimination work, but caused little trouble in the general crop. Helminthosporium blight (H. victoriae) was found in two farm fields. For the first time, the new races of crown rust (presumably either 213 or 216) appeared naturally in this section. This rust was collected on Southland growing near Dillon, S.C. Even though all of the more widely grown varieties are susceptible to at least one of the three southern races of smut, no significant smut infection in farm fields was observed or reported.

Fall plantings in 1954 were seriously hindered by extreme dry weather extending through October. Seedings thus were generally delayed well beyond the optimum planting dates. Fortunately, adequate rainfall and moderate temperatures in recent weeks have permitted oats to become very well established. Prospects at this time (early January 1955) are therefore quite favorable for breeding work and farm production.

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## TENNESSEE

by N. I. Hancock (Knoxville)

Difficulties were encountered in space planting $F_2$ generation of oat crosses in early August for segregates resistant to natural infections of leaf rust. There were 1,600--3 foot rows, with 10 seeds spaced 4 inches apart in each row, which should give 16,000 plants. All alleyways were planted lengthwise to Forkedeer which is very susceptible to races of leaf rust. High temperatures and low humidities made it necessary to irrigate frequently. Thus, the plants grew vigorously and along with this growth came weeds and grass. So that the cost was considerable for cleaning this nursery, and plants were spaced too close. On Account of the drought in general over the state leaf rust did not appear until October 5. Low temperatures by October 18 did not permit a wide spread of infection. The race of leaf rust was identified as 202 by Dr. Simons. Under such conditions should artificial inoculations have been resorted to and chemical weed controls employed?

Time intervals of a given growth of the panicle primordia above ground varied as much as 3 weeks between semi-winter and winterhardy varieties, such as Fulgrain compared with Forkedeer. This measure may be valuable for indicating degrees of dormancy as well as the time when grazing of small grains should be ended. These observations were taken through March and are simple to make in field with aid of hand lens.

Vernalized Forkedeer seed planted on March 22 produced typical spring habit of growth as compared with late, non-prolific stooling habit of controls, and yielded 57.8 bushels per acre as compared with 28.7 bushels for controls of non-vernalized seed.

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# TEXAS

by I. M. Atkins and G. W. Rivers (State College)

## Oat Improvement Work in Texas

Production of oats in Texas in 1954 was estimated as 41,354,000 bushels, the largest crop since 1940. Acreage was expanded sharply but yield per acre was less than the very favorable 1953 season. Severe drought throughout the winter months and damage by low temperatures caused some loss in acreage but the spring season was favorable for the crop. Diseases and insects were only of minor importance this season.

The new variety, Alamo, released to certified growers for the 1954 crop, gave excellent performance under farm conditions. A total of 497 acres was certified and most of the seed was sold for further increase. The winter hardiness of Mustang was demonstrated repeatedly on farms as large acreages of Red Rustproof were winterkilled.

Feed analysis of Mustang, Red Rustproof (New Nortex) and Alamo were made from the 1953 and 1954 crops grown at four locations. Mustang and Alamo proved to be significantly lower in fibre than New Nortex, approximately 1.5 percent, and Mustang averaged 1.25 percent higher in oil content. On a percentage basis this is nearly 25 percent higher than New Nortex. There were no significant differences between varieties in the other constituents determined.

In the breeding program, particular attention is being given to fortify present good varieties with still better disease resistance. Although neither Race 213 of crown rust nor 7A of stem rust have yet become prevalent in Texas, the expected rapid expansion of acreage of Alamo and Mustang will provide favorable situations for the spread of these races. Hybrid lines incorporating resistance to these races and to Helminthosporium blight will enter yield tests this season.

The acreages of small grains for winter pasture in the fall of 1954 was estimated as 400,000 acres. Since most of this is oats, special attention is being given to forage characteristics of all new varieties and strains. There is an increasing interest and use of oats for grass silage. It is used alone and in combination with sweet clover. A taller, ranker type of growth is desired for this purpose than is best adapted to grain production.

The use of 60 pounds of phosphoric acid per acre proved highly profitable for increasing forage production of oats in North Central Texas tests. Weight of green forage was increased from 557 pounds to 1792 pounds. The use of nitrogen and potash was not justified over that of phosphorous alone. Neither nitrogen nor phosphorous alone was effective in increasing grain yields but a combination of the two was effective and profitable in raising the yields from 42.5 bushels in the check to 67.6 in the fertilized plots.

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# WISCONSIN

by H. L. Shands (Madison)

The average yield of Wisconsin oats was 44.0 bushels per acre or 2.5 bushels more than 1953. Estimates of crown and stem rust losses were lower in 1954 than in 1953. Percentage loss estimates are as follows:

| Rust | 1953 | 1954 |
|---|---|---|
| Crown | 5 | 3 |
| Stem | 7 | 4 |

Even though stem and crown rust losses decreased in 1954 there was enough to be bothersome. Clinton and similar varieties were under pressure from race 7 and presumably race 202 (45) of crown rust. Race 8 of stem rust appeared late in the season in northern Wisconsin and attacked Ajax, Branch and Sauk.

A varietal acreage survey made by the Crop Reporting Service (Wis. Dept. Agr. and U.S.D.A.) showed that Clinton, Bonda, Branch and Ajax were the leading varieties having approximately 29, 24, 20 and 10 per cent respectively of the Madison oat acreage.

Through courtesy of the Seed Certification Service, some information was obtained as to production of the different oat varieties on certified seed producers' fields. The total acreage reported and yields in bushels per acre are listed below:

| | A. | Bu./Ac. |
|---|---|---|
| Bonda | 1087.5 | 40.14 |
| Branch | 1077.5 | 48.94 |
| Clintafe | 662.5 | 40.23 |
| Clinton | 1062.5 | 38.64 |
| Sauk | 1745.5 | 57.56 |

While it is not possible to make strict comparisons from the above data, yet they seem to be rather reliable as to the 1954 production under field conditions. The Clinton yield per acre was decreased by one report of around 200 acres where the yield was given as only nine bushels per acre. These fields were in Rock County in the buckthorn area, which emphasizes the need for reducing this alternate host. The yield reports for the individual varieties above are complicated by the fact that some seed producers grew different varieties and not many produced all six varieties on the same farm. The lower Branch yield suggests that it may have been on fields lower in fertility. Further comparisons of varieties grown on the same farm follow:

Paired comparisons reported by the same grower of certified seed

| Varieties paired | No. comparisons | Yield in bu. per A. | Varieties paired | No. comparisons | Yield in bu. per A. |
|---|---|---|---|---|---|
| Branch | 67 | 51.5 | Clintland | 38 | 54.6 |
| Sauk | 67 | 55.8 | Clinton | 38 | 48.2 |
| Branch | 49 | 51.7 | Clintland | 101 | 50.4 |
| Clintland | 49 | 47.4 | Sauk | 101 | 58.9 |
| Clintafe | 36 | 36.7 | Clintafe | 30 | 44.6 |
| Clintland | 36 | 51.8 | Clintland | 30 | 51.4 |
| | | | Sauk | 30 | 59.6 |

Since there were more than 3,000 acres of Sauk grown for certified seed production, there was likely about 175,000 bushels produced of Sauk. Seed production of Clintland and Clintafe was near 100,000 and 60,000 bushels respectively.

C.I. 6752 (X436-2) is being increased in 1955. A decision on release may be made in December.

While observing the breeding nursery, Dr. H. C. Murphy noted an Ajax plant with good stem rust resistance in the $X_2$ generation. A further search did not reveal any other plants as promising as the one seen by Dr. Murphy. Limited populations in the $N_1$ generation (seed treated by) Dr. C. F. Konzak showed lowered germination and vigor reduction.

Some of the Mohawk lines of Dr. Konzak gave promise of more stem rust resistance than Mohawk, and some lines gave indication of crown rust resistance. Panicles were usually more lax than Mohawk.

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The writer has been aided by Dr. D. C. Arny, M. L. Kaufman, L. G. Cruger and A.J. Bourne. Mr. Cruger has been working on Septoria under sponsorship of the Quaker Oats Assistantship. He is planning military service in the near future. Mr. Bourne is a new assistant in the small grain program.

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Dr. A. L. Hooker joined the Office of Cereal Crops and Diseases and has been located with the Plant Pathology Department of the University of Wisconsin and has been assigned the Septoria problem in oats, and certain oat leaf diseases.

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By D. C. Arny (Madison)

Red leaf (virus) was rather severe in late planted oats at Madison in 1954. A number of varieties and selections were grown in 4 different plantings in the nursery. Estimates of the percentage of plants showing red leaf symptoms were made soon after heading. Analysis of the transformed data ($p = \sin^2 \theta$) indicate that there were differences between varieties. Varietal averages are given in the table below. It is recognized that these evaluations will have to stand the test of time.

Blue dwarf was observed for the first time in Wisconsin. It was quite abundant in yield plots at Madison, and was found in 6 out of 32 fields examined in S.W. Wisconsin.

| Variety | C.I. | Red Leaf[a] | Variety | C.I. | Red Leaf[a] | Variety | C.I. | Red Leaf[a] |
|---|---|---|---|---|---|---|---|---|
| States Pride | 1154 | 17 | Waubay | 5440 | 26 | Rodney | 6661 | 24 |
| -- | 1841 | 27 | Jackson | 5441 | 12 | Garry | 6662 | 28 |
| Gopher | 2027 | 16 | Cherokee Sel. | 5444 | 27 | -- | 6688 | 11 |
| -- | 2166 | 10 | Clarion | 5647 | 10 | Clintland | 6701 | 23 |
| Tama | 3502 | 28 | Clintafe | 5869 | 27 | -- | 6752 | 20 |
| Vicland | 3611 | 26 | -- | 5870 | 37 | -- | 6765 | 21 |
| Clinton | 3971 | 23 | -- | 5871 | 32 | Simcoe | 6767 | 12 |
| Ajax | 4157 | 17 | -- | 5927 | 21 | -- | 6774 | 25 |
| Andrew | 4170 | 18 | -- | 5940 | 17 | -- | 6913 | 21 |
| Clinton 59 | 4259 | 16 | Sauk | 5946 | 24 | -- | 6928 | 26 |
| Nemaha | 4301 | 30 | -- | 5960 | 23 | -- | 6929 | 27 |
| Bonda | 4329 | 34 | -- | 5966 | 22 | -- | 6930 | 15 |
| Beaver | 4521 | 22 | -- | 5967 | 13 | -- | 6931 | 25 |
| Larain | 4611 | 23 | -- | 6537 | 24 | -- | 6932 | 23 |
| Dupree | 4672 | 12 | -- | 6612 | 34 | -- | 6933 | 11 |
| Bonham | 4676 | 24 | -- | 6641 | 7 | -- | 6934 | 25 |
| Abegweit | 4970 | 48 | -- | 6642 | 21 | -- | 6935 | 32 |
| Mo. 0-205 | 4988 | 24 | -- | 6644 | 23 | -- | 6936 | 27 |
| Branch | 5013 | 24 | -- | 6647 | 24 | | | |
| Alamo | 5371 | 38 | -- | 6649 | 28 | L.S.D. | -- | 14 |

[a]Transformed from per cent to $\sin^2 \theta$. Average of 4 replications.

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## MINNESOTA

by W. M. Myers, F. K. S. Koo, M. B. Moore,
and B. J. Roberts (St. Paul)

Minland (C.I. 6765), a new oat variety formerly designated as Landhafer x (Mindo x Hajira-Joanette) II-46-3, has recently been released by the Minnesota Agricultural Experiment Station. This variety is resistant to all races of crown rust that are prevalent in North America, all races of stem rust except 7A, and smuts. It has been tested for three years at various locations in Minnesota and the results indicate that it has yielded slightly more than Andrew on the average. In the north central states uniform yield trials in 1953-54, it has shown to be higher in yield than Andrew at several locations. It is essentially like Andrew in maturity, height, seed size, and hull percentage (about 23%). Test weight is low -- about like Clintafe. It is superior to Andrew, Clinton and Clintafe in lodging resistance. It is recognized that this is not a distinctly superior variety. However, it does afford protection from crown rust and both races 7 and 8 of stem rust, a combination not at present available in an oat variety. With more than 1000 bushels of foundation seed already available, it can be put into production rapidly and will, we believe, serve a useful function for a few years until better varieties with combined resistance are ready.

Landhafer x (Bond-Rainbow x Hajira-Joanette) II-47-25, (C.I. 6913), has had the same amount of testing as Minland in Minnesota. The results indicate that it has been superior to Minland in yielding ability. In the north central states uniform yield trials for the past year, it has shown to be one of the top yielders. This selection is resistant to all prevalent races of crown rust, all races of stem rust including 7A, and the smuts. It is essentially like Andrew and Minland in maturity and plant height. The seed is slightly larger and test weight slightly higher than for Andrew. It is distinctly superior to Andrew, Clinton and Clintafe in lodging resistance. It is being increased in a limited amount in Arizona over winter and will be increased again on a larger scale next spring.

In the greenhouse and field tests, plants resistant to both races 7 and 8 of stem rust were obtained from the panicle progenies ($R_2$'s) of the thermal neutron treated Ajax and Clintafe. However, no resistant plant was found in the progenies of treated Saia when tested to race 205 of crown rust in the greenhouse. In the field, the progenies ($R_3$'s) of selected resistant plants proved either to breed true for resistance to both races or to breed true to one race and segregate to the other. Further studies will be carried out in the greenhouse on their reactions to several races at high as well as moderate temperatures.

For studies of radiation genetics, Landhafer x (Bond-Rainbow x Hajira-Joanette) II-47-25 and Saia were treated with X-rays and thermal neutrons of three dosages each at the Brookhaven National Laboratory. Three measurable events produced by radiation are the main subjects of

this study. The immediate deleterious effects of radiation on survival and plant height were studied last summer in the field at University Farm. The seedling mutation rate and chromosomal abberations persistent to sporogenesis are also being examined.

Cytological observations on certain combinations of the oat interspecific crosses have been completed. The results indicate that a very close relationship exists among the diploid species as expected and in a lesser degree among the hexaploid species. Observations also suggest that one or only a few chromosomes may be responsible for the species differentiation in hexaploids. The chromosomal association in the crosses between tetraploid and hexaploid suggests that the two polyploids may have only one genome in common or partially in common. The "species complex" characters such as base type, awn development, and pubescence have been studied in $F_2$'s of the hexaploid species crosses. The results indicate that the species complex is conditioned by several closely linked genes. The byzantina complex appears to be dominant over the fatua, sterilis, and ludoviciana complexes and these latter ones in turn are dominant over the sativa complex. The gene for base type has different manifestations on the primary and secondary kernels.

M. Tabata and N. Tuleen of the Department of Agronomy and Plant Genetics and K. R. Walker of the Department of Plant Pathology and Botany hold assistantships in connection with studies of oats. Tabata is working on species crosses, Tuleen on breeding, and Walker on disease problems.

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## GEORGIA

by U. R. Gore, E. S. Luttrel (Experiment)

After the severe drought in Georgia in 1954 which cut corn and hay yield farmers planted a larger acreage of oats and prospects are for the biggest oat harvest ever.

More oats are being planted for winter grazing in Georgia for dairy and beef cattle. Results of grazing experiments show that oats sown early on fallowed land and well fertilized will produce up to 600 pounds choice beef per acre by grazing steers from December to June. Other results show that grazing oats and ryegrass 2 hours a day with dairy cows is sufficient to keep the milk flow at maximum.

Testing of oats for soil borne virus (Marmor terrestre Var. typicum and M. terrestre Var. oculatum was continued at Experiment in 1954 since the nursery plot soil is infested. We shall be glad to test a few advanced lines for all oat breeders in this country and Canada. Send two-5 gram samples of seed to be tested for fall seeding. Winter-killing has not been too heavy at Experiment. Crosses with stem rust resistant parents, Landhafer X Mindo X (Hajira X Joannette) or Bond-Rainbow X Hajira-Joannette

have shown almost 100 percent very severe rosette types. This may complicate our breeding program for resistance to stem rust races 7 and 8.

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## OAT DISEASE SITUATION IN INDIA

by R. S. Vasudeva

Oats are grown in India chiefly as a forage crop and rarely as a breakfast cereal. The crop is grown during the cold season (October-April) and is attacked by a number of serious diseases such as Black Rust, Covered and Loose Smut and Helminthosporium Leaf Spot.

Black Rust (Puccinia graminis-avenae (Pers.) Eriks. & Henn.)

This crop is badly damaged by this rust in the Nilgiris (South India) but it has not been reported from any other locality in India so far. Preliminary work done so far has shown that there are 4 physiologic races of this rust in India, which have been identified as races 3,4,6 and 7 according to International Key of Oat Rust Race flora. The disease has been found to perpetuate in uredial stage on selfsown plants and two alternative hosts namely Vulpia myuros and Briza minor, which are common perennial grasses in the Nilgiris.

During 1948, Oat variety N.P. 1 at Delhi got infected with rust at a very late stage of maturity showing small, resistant type of pustules. The pustules were just the size of a pin head, separate, few, and appeared on glumes only. On analysis, this rust proved to be race 21 of Puccinia graminis-tritici (Pers.) Eriks. and Henn.

Helminthosporium leafspot (Helminthosporium avenae Eidam)

This disease is fairly widespread throughout the country and causes severe leaf spot injury at several places. Primary infection of seedlings, which takes place through diseased seed and also through collateral hosts like Briza minor and Avena fatua, is not so destructive but it serves as a source for secondary infection resulting in severe leafspot attack later in the season.

Helminthosporium victoriae M. & M. and the perfect stage of H. avenae Eidam (Pyrenophora avenae Ito and Kuribayashi) have not so far been recorded from India.

Smuts: - The two smuts of this crop, covered smut (Ustilago kolleri Wille) and Loose Smut (Ustilago avenae (Pers.) Rostr.) are prevalent throughout the country. The former is much more common and is reported to cause heavy losses, 10-25 percent infection has been often observed in certain fields. Dry Spray Method of Formalin seed-treatment gives satisfactory control of both these diseases.

A few other diseases, which are of minor importance, have been recorded off and on from India on this crop e.g. Crown Rust (Puccinia coronata Corda), Root Rot (Pythium graminicolum Subr.), Stem Rot (Sclerotinia sclerotiorum (Lib.) de Bary) and Leafspot (Epicoccum neglectum Desm.).

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## V. NEW OAT VARIETIES



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### Alamo

Alamo, C.I. 5371 (Victoria-Hajira-Banner, C.I. 4019 x Fulghum-Victoria, C.I. 3528) is a new variety of red oats developed for fall-seeding in South Texas and for spring-seeding in North Texas. It is resistant to races of crown and stem rust which have been prevalent in this State. It is very susceptible to Helminthosporium blight and only moderately winter hardy. The variety has strong straw and is well adapted to direct combining under many conditions. The seed is red, it has no awns and produces grain of very high test weight. (by I. M. Atkins and G. W. Rivers)

## New Oat Variety, "Cimarron," Equally Good for Fall or Spring

A new "two-way" oat, making high grain yields from either fall or spring seeding, will be available from Oklahoma certified seed growers for fall planting in 1955.

The new variety, named "Cimarron," has early maturity from either spring or fall planting, and is a better winter pasture variety than Wintok.

Cimarron will be recommended for planting only in the northern and western parts of Oklahoma. Area of adaptation, as shown by the Oklahoma A. & M. College's state-wide small-grain testing program, is north and west of a line running from western Osage county to the Cotton-Jefferson county line. In other words, this is the line from the point where State Highway 99 enters Oklahoma on the north to the point where U. S. 81 crosses the Red River into Texas.

About three thousand bushels of foundation seed of Cimarron are being placed with certified seed growers by Oklahoma Foundation Seed Stocks Inc., for fall planting in 1954. Certified seed will be available for general farm planting after the 1955 harvest.

Cimarron was developed by Dr. A. M. Schlehuber, a small-grain breeder at the Oklahoma Agricultural Experiment Station. It was tested under the designation C.I. 5106.

Grain yields of Cimarron oats from fall plantings have exceeded other fall-planted strains by 12 to 17 percent in five years of testing at Perkins, Woodward, Cherokee, and Goodwell. In the state-wide variety trials it has been approximately equal in yield to other winter-hardy varieties in northern and western Oklahoma, but has been inferior to other varieties in eastern Oklahoma.

The unique ability of Cimarron, a winter-hardy oat, to perform well from spring seeding is shown by four year's testing at Stillwater. It averaged 37.4 bushels per acre as compared to 38.2 for Andrew, a true spring variety; and it exceeded Kanota by 4.4 bushels per acre.

Winter-hardiness of Cimarron in numerous trials throughout the winter oat area of the United States has been 77.7 percent as compared to 84.1 for Wintok, the most winter hardy variety now available. Test weight is equal to Wintok, a heavy oat.

Early maturity is one of Cimarron's outstanding characteristics. It heads and ripens five days earlier than Wintok and Tennex, and seven days ahead of Forkedeer.

In forage production for winter grazing, Cimarron rated 10 to 12 percent above Wintok in five years of testing at Stillwater.

The new oat variety traces back to a few plants which survived the severe winter of 1934-35 at the Southern Great Plains Field Station at Woodward, Oklahoma. The progeny were carried as an experimental winter-hardy strain until 1946, when selection for earliness was made. The early-maturing panicles were planted at Stillwater in the fall of that year, and had 80 percent survival despite temperatures as low as 17 below zero in February of 1947. About three pounds of seed were harvested. It has been tested continuously for grain yield and other characters in nursery and/or field plots since 1948. (from A. M. Schlehuber)

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